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EDITORIALS

IT IS TIME TO ACT

AUTHORITY to make and enforce laws for the protection of the public health is part of the police powers of every government. It does not depend upon any express grant, but is an incident to government itself. It was adherent in each of the thirteen sovereign States when they, by the delegation of certain of their powers, created that part of the government of this country known as the federal government, in contradistinction from that other part known as our State governments. And as the police power was not among the powers thus delegated, the right to make and enforce laws for the protection of public health still resides in the State governments and is not vested in the government of the United States, except in so far as relates to those parts of our country that are not under State control. It follows, then, that no federal public health service can displace the States' services, or in any way limit their jurisdiction, and, therefore, it follows further that no federal public health

service can be in any large degree successful which does not lend itself to the upbuilding of States' services where upbuilding is necessary, and to the bringing about of coöperation amongst the States' services themselves and between them and the federal service, and which does not win their support, respect and sympathy.

The federal government is in a large degree powerless in the making and enforcing of public health laws, but there are functions of government over and beyond the mere making and enforcement of criminal statutes. Because the government cannot put itself into a position where its officers can prosecute its citizens because of offences against the public health, it does not follow that the government has no interest in the conservation and promotion of the health of its people. Every government has an interest in the health of its people; and most of all has our government such an interest, for one of the very purposes for which it was created was to provide for the common welfare, and health is the corner stone upon which all welfare whatsoever rests. The federal government cannot regulate education; yet it endeavors to foster education and maintains a bureau for that very purpose. It cannot regulate agriculture; nevertheless it endeavors to promote agricultural interests, and to that end has created one of the most extensive of the government establishments. It cannot regulate labor; but its bureau of labor has long been recognized as an essential part of the government machinery. And what the government has done and is doing for education and for labor and for agriculture, it can do for public health. Refusing any longer to tack public health functions on to the work of this bureau and that, scattering them without any effort at correlation whatsoever, it can frankly admit its interest in the health of its people and claim its rightful jurisdiction in the premises by creating a proper bureau for the discharge of public health functions.

As to what constitutes a proper bureau for the discharge

of public health functions we are unfortunately not agreed. Because of varying degrees of information concerning the subject, of varying degrees of self-interest and of varying points of view, we entertain divergent opinions, which we seem to be unable to reconcile one with another. But the factors which cause physical inefficiency and disease are hindered by no such lack of harmony among themselves, but with a singleness of purpose, well worthy of emulation, are working night and day toward the same unchanging end, disease and death. The problem is a large one and its ramifications are numerous. The most that can be hoped for at the present time is a step in the right direction, and for the attainment of our ultimate goal we must expect to wait for no inconsiderable period. None of us must be disappointed if he does not see all of his ideals embodied in the legislation the enactment of which we are confidently looking forward to during the coming session of Congress. If such legislation be but a substantial move in the right direction, we can safely leave to the future the right growth of the service. If a false step be taken, progress will be accordingly hindered. It behooves each of us, then, to watch closely the trend of events and to lend his best efforts to the framing and the enactment of right legislation, and to the opposing of legislation of any other kind. Failure at the present time can be due only to inertia and lack of organization among public health workers.

WM. C. WOODWARD.

NOTE. — The Editors believe that the Committee of Seven, representing the American Public Health Association, and therefore the professional hygienists of this country, and the Committee on a Federal Department of Health of the same Association should seriously take upon themselves, for the professional hygienists, the watching of legislation and the notification of members of the Association of the progress of events. It is time to ACT.

PERSONAL *vs.* PUBLIC HYGIENE

It has been said that personal hygiene is the basis of public hygiene; that if *every individual* practised the rules necessary to the escape from infectious disease, public hygiene, chiefly concerned with preventing the spread of infection, might go out of business. It is true that personal hygiene, in its larger sense of correct physiological living, has probably no one established set of rules, or rather, as Richard Cabot has said, there needs must be a dozen, perhaps fifty sets of rules to fit different types of people and conditions of life. But so much of these rules as relates to the defence against infection would be uniform for all types of people and, in fact, might be condensed to one rule, "*do not swallow* (or inhale or touch) *the discharges of others*," for in a large, general way almost all of our infectious diseases are transmitted by taking the discharges of others into the mouth.

If this one rule alone be necessary to the abolition of infectious diseases, why not abandon the elaborate mechanism of public health work, with its many subdivisions, technicalities and intricacies, and devote ourselves wholly to teaching it?

The man who lives on his own estate may indeed prevent, for himself and his family, "the swallowing of the discharges of others" by a rigid asepticism concerning food, milk, eating utensils, hands of attendants, own hands, etc., *because he has full control.* For such a man public hygiene need not exist, so long as he remains within his own grounds. But let him travel or even go to his city office, let his family attend church, school, theater. At once begins contact with persons not of their household; hands, rooms, perhaps food, water, eating utensils, not under their control, all bearing in

some form or manner traces of the discharges of others. The cordon is broken.

The waiter at the hotel breakfast room may be nursing a brother with typhoid, the waitress at the noon lunch counter may be a diphtheria carrier, the chambermaid may have tuberculosis, the Pullman porter syphilis, the milk may be infected with scarlet fever, the schoolmate may have almost anything. By a thousand insidious pathways they touch, inhale and swallow discharges of many persons. True, the chances of infection are small, for the amount of discharge so conveyed is usually infinitesimal, and in the majority of cases uninfected, and natural resistance, if unimpaired, will counteract much infection. But multiply the chances one individual takes in a day by the number of individuals taking them and the result is the annual morbidity and mortality tables concerning the infectious diseases.

It is at the point where the individual and his family leave the domain which they may control, that public hygiene steps in or should step in. Public hygiene says, or should say: "What you do for yourself at home we do for you in public; the foods from public sources, and especially the milk, are free from the discharges of other persons or animals, at least of those sick from infectious diseases; the waiters and waitresses are known, medically inspected and have no sickness in their families; the schools to which you send your children, the public conveyances in which they ride, the barber who shaves you, the school children your boys and girls meet, these are all medically uninfectious; the ventilation of public places is good, and the water supplied you is non-poisonous."

No public hygienist can dictate to the individual in his own home how he shall live physically, any more than morally; both personal hygiene and personal morality are matters for personal teaching and "moral suasion." But the public hygienist can and should see that the *public* purveyor of

food and drink, and of all personal service of every description, is free of infection. Medical school inspection, begun in Boston, is well. We await the extension of the same principle, to the same ends, for all public personal service, including all purveyance of food or drink, believing that in this lies the justification as well as the chief domain of *public* as contrasted with *personal* hygiene. The suppression of epidemics early and with small loss is a great achievement, a much greater one is to so conduct public affairs from the standpoint of public hygiene that there are no epidemics to suppress.

H. W. HILL.

AMERICAN PUBLIC HEALTH ASSOCIATION*

PRESIDENT'S ADDRESS

DR. RICHARD H. LEWIS, Raleigh, North Carolina

Members of the Association, Ladies and Gentlemen:

When as a boy I read Ballantyne's story of "The Young Fur Traders," a story dealing with the operations of the Hudson Bay Company, the central scene of which was laid on the very spot where we are assembled today, then Fort Garry, I little dreamed that the time would come when I should appear here as the head of a great international society. In the wildest flights of my youthful imagination it never occurred to me that Aladdin with his wonderful lamp would wander so far from home and evoke a *génie* who in a night, as it were, would transform the birch-bark canoes into steamboats, the sledges and pack trains into railways, the *voyageurs* and trappers into captains of industry, the wilderness into a sea of golden grain to feed the nations of the world, and the little trading post into this splendid city. Yet such is the accomplished fact, although we may feel that the good *génie* has scarcely more than begun his work, and the boy of forty odd years ago stands before you and begs to express his profound appreciation of the great honor you have conferred upon him, the result, he must feel, rather of the partiality of your kind hearts than the better judgment of your intellects.

As you are no doubt all aware, the President of the United States called a meeting at the White House to consider the vital question of the conservation of the natural resources of the country, which are being wasted with such lavish

* According to the agreement between the American Public Health Association and the editors of this journal, the Publication Committee of the Association is responsible for the arrangement of the papers, which are printed in the order in which they are received.

prodigality as to make the judicious grieve and the wise to take alarm. Primarily the invitations to the conference with the President were extended to the governors of the States and Territories of the Union, each to bring with him three leading citizens as advisers, the two Houses of Congress, and the Supreme Court; but later the scope of the meeting was enlarged and one representative from each of the leading national organizations in any way interested in the problem was included. Such an invitation was sent to your President, as the representative of the American Public Health Association. The meeting was held May 15–18 in the East Room of the White House. I attended and was much impressed with the personnel of the membership, and with the papers and discussions to be expected of men of such prominence. Following the White House conference, President Roosevelt appointed a National Conservation Commission, with the Hon. Gifford Pinchot as chairman. The coöperation of the various organizations represented at Washington with the Commission is desired, and I learn from Bulletin No. 2, recently issued by the Commission, that a number of national organizations have responded by appointing special committees to act in coöperation with the Commission. I would recommend that we take similar action.

The subject of such wide scope as to make it worthy of consideration by an association of this character, which is exciting most interest at the present time, in my own country certainly, is the development of a national department, or bureau of health.

The Republic of Mexico, being a confederation of free and sovereign States, the conditions prevailing there are very much the same as with us, although greater progress in the centralization of sanitary powers has been made. The Supreme Board of Health is analogous to our Public Health and Marine Hospital Service, with much the same functions. But the report on this subject by Dr. Liceaga, the Chairman

of the Committee for Mexico, has been received and will be read to you.

The Dominion of Canada, while it has a Director-General of Public Health, thus emphasizing the federal or national idea, has no single national department of public health, but the agencies of the general government having executive powers in the administration of the laws of sanitation are scattered through several departments. So the conditions obtaining in the Dominion are quite similar to those in the United States, and possibly what I shall say in discussing the problem as it exists in my own country may throw a side light, feeble as it doubtless will be, upon theirs.

It would be a work of supererogation and a dealing in platitudes to reiterate to such an audience as this, composed as it is of the leading sanitarians of North America, the general arguments for the establishment of a national department or bureau of public health with which we are all so familiar. There is no question of the need of such a department. What we all want, as guardians of the public health, is a central or national organization worthy of the dignity, power and resources of our respective countries — the very best that brains and money can produce.

Dr. Charles Harrington, in his very able oration on State Medicine, entitled "States' Rights and the National Health," delivered at the recent meeting of the American Medical Association, has called attention to the difficulties attending the ideal administration of a national department of public health in the United States resulting from the dual nature of the government, — the power possessed by the several States under the Constitution to prevent the interference of the Federal government in their local affairs. To my mind these objections, certainly in the present stage of our sanitary development, are more academic than practical. As a matter of fact, the importance of this phase of the subject really depends upon the character and functions of the national

bureau we desire. Do we desire a bureau with full executive powers or one of an advisory character, but endowed with authority and means to assist and coöperate with the States and municipalities upon request, when the urgency of the situation is such as to make help necessary, not only for the protection of the community affected, but of the whole country, or at least of a considerable part of it? A bureau, with full executive powers, is not only impracticable but undesirable. If general executive powers should be exercised by the national bureau in the States independent of the State boards of health, it would surely result in the weakening of all, and in the probable destruction of many not already strongly establishd. It is unquestionably to the interest of the general cause that each State should look after its own health work, acting always, however, in a spirit of cordial coöperation with the great national bureau, which spirit the latter should be very careful to foster and encourage in every way, not only in its own interests, but in that of the whole country. It would not be at all difficult to so conduct the national bureau as to have the State boards look to it as both guide and friend. Indeed, such is largely the fact now, certainly so far as my own State is concerned, in its relations with our present bureau. The invaluable assistance rendered the city of New Orleans and the surrounding country by the Public Health and Marine Hospital Service in the epidemic of yellow fever in 1905, and to San Francisco and California in fighting the bubonic plague, strikingly illustrates this position. This bureau is already charged with interstate quarantine and, as we have seen, it can practically aid in stamping out epidemics within the States, notwithstanding the doctrine of States' rights. The fact that no provision is made for the expenditure of money in this work, beyond the salaries of its officers, can be remedied by legislation, I am sure. Under our Constitution the governor of a State, in case of an insurrection of such proportions as to

successfully defy the powers of the State, can call upon the President of the United States to send to his aid the thoroughly trained troops of the Regular Army. Now our business is that of war, — war against a foe so numerous and so armed with the agencies of disease and death as to make an army with banners pale into insignificance. Indeed, if we could see the waving of the banners and hear the roll of the drums, and the shouting of the captains, there would be no difficulty in securing men and treasure to defend our firesides. It is because the enemy we have to fight is so still, so secret and, to the uneducated mind, so mysterious, that it is extremely difficult, as we all know, to get the people to realize the danger; and just here, in this lack of faith, through ignorance, we encounter the fundamental difficulty in the administration of sanitary laws. But in great epidemics the evidence is so plain that the people wake up and they are ready to call for help from any source and, as we have seen, they can secure it from the national bureau. So, practically, in my opinion, the States' rights difficulty is not a serious one.

In a general way the kind of national bureau of public health we ought to have, and the kind I think most of us desire, is one including within its scope and management all the specific health agencies of the government now in existence, with the addition of others when needed, so thoroughly manned by the best men in their respective departments and so richly endowed with funds that work of the highest class in demonstrating the principles underlying all subjects bearing upon the public health can be done. Having, by the study of the work of others and by original research, settled upon the correct principles of sanitation, it should make a practical application of them to the actual everyday problems of preventive medicine in the sanitary management of the District of Columbia and the Territories over which the United States has absolute control; it should give, so to speak, a clinical demonstration of the best methods

as carried out by its own thoroughly educated and trained health officers. The city of Washington should be made a model of sanitary management for our larger cities (I was gratified to learn that Mr. Taft has advanced this same idea), and similarly the smaller towns, villages, hamlets and rural communities of the District should be made models for others of like character. Health laws can best be administered by a benevolent despotism, and as the people of the District of Columbia have no voice in its government, the principles of sanitation could be applied there *secundem artem* as in no other part of the country.

But it is as a source of information and education that we will find the chief value of the bureau: first, in the education of its own officials and the health officers of the country; second, of the medical profession; and, third, of the people.

In a bill now pending in Congress, further enlarging the powers and duties of the Public Health and Marine Hospital Service, authority is given for the establishment of a school of hygiene for the training, free of charge, of such health officers as may choose to attend. The granting of certificates is allowed, but it should go further and grant the degree of Doctor of Public Health, as is done in England. In this way we might hope for the gradual development of a sanitary profession of equal dignity with that of medicine or the other regular professions. But it should not stop there. In conjunction with the army and navy it should conduct a school of tropical medicine. Since our country has come into possession of territories in equatorial regions, special training in the prevention and treatment of diseases peculiar to the tropics should be given all health and medical officers liable to be assigned to duty in such latitudes. At present to obtain thorough training in this branch of medicine we must go abroad.

The natural, logical and, if interested, most efficient teacher

of hygiene to the people is the family physician, but we all know too well the general apathy and indifference of the medical profession as a whole on this subject. Their cordial coöperation would be worth everything else, and an earnest effort should be made to interest and at the same time instruct them in hygienic principles and practices by the issuing of a monthly bulletin especially prepared for the purpose and regularly mailed to every doctor in the country.

The education of the people would have to be accomplished through the distribution of literature and by popular lectures. A literary and lecture division should be the principal division of the bureau. The literature, in the form of circulars, should be carefully prepared and written in a style to appeal to the popular mind, and special articles should be written for the children of the public schools. The bureau, having the franking privilege, could have the mail carriers, urban and rural, leave a circular at every house, and it would, moreover, being a part of the Federal government, have the right to put up in the post-office buildings placards setting forth the general rules of health as well as the rules for special diseases. In this way all the people of the country could be enlightened on every subject bearing upon the public health at a relatively trifling cost. The State boards of health are, for the most part, debarred the use of this plan of campaign, because they cannot, in the first place, obtain the addresses of all the people, and if they could they would not have the money to pay the clerk hire and postage; besides, they are not permitted to put up notices in post offices.

To illustrate the practical working of this scheme, let us suppose an outbreak of diphtheria in Smithville, say. As soon as the secretary of the State Board of Health is notified he could wire the head of the national bureau, "Epidemic of diphtheria in Smithville. Please circularize that community;" and all the people would be immediately sup-

plied with the most authoritative literature on the subject when deeply interested in it; it would be striking while the iron is hot, and an impression would be made. But education by circular is not sufficient. It should be supplemented by word of mouth. A corps of lecturers, good talkers from any calling, should be maintained. Having been thoroughly prepared in the School of Hygiene and fully equipped, they should be sent abroad through the country as evangelists of health, to such States as might ask for them.

After all is said, the education of the people is the most important feature of the hygienic problem, and it is not unreasonable to believe that if such a plan as I have imperfectly outlined were vigorously and earnestly pursued there would be created within a decade a favorable public opinion that would be irresistible.

A *sine qua non* in the administration of the bureau is money, and plenty of it. This leads me to suggest a method by which this can be made, or at least saved to the people by the bureau itself. Mr. Samuel Hopkins Adams, in an article on the "Guardians of the Public Health," in the July number of *McClure's Magazine*, says that the State of Massachusetts saved to its people in one year $210,000, $74,000 more than the total appropriation for the public health work, by the free distribution of vaccine and antitoxin made in its own laboratories. The United States Hygienic Laboratory is already making anti-rabic virus. If it were to extend this line of work to vaccine, antitoxin and the curative serums for distribution to the people of the whole country it would save, basing the calculation upon the ratio of the population of Massachusetts to that of the Republic, $7,000,000, which would be more than enough to cover an appropriation worthy of the great bureau we desire, — an amount, by the way, just equal to that annually expended by the Agricultural Department on animal and plant diseases. But even if supplied at cost it would mean a very great saving to the

people. It is not necessary, however, to work for an appropriation in this way. When we consider that the government expends more than two hundred million dollars upon the army and navy in preparation for the potential attack of a foreign foe, the people certainly have the right to demand the appropriation of two or three per cent of that amount to fight the actual enemies that constantly surround us, and which, at one time or another, unless checked in their advance, will surely bring disease and death into every family in our land. To us on the firing line this is all too plain for argument, but it is not so with the people nor with our representatives in Congress. They must be educated to realize its importance. Our own Association has done much towards this end by blazing the way and fostering and encouraging various movements in the interest of the public health; the different boards of health, State and municipal, and the medical societies of the country, with the American Medical Association in the lead, have done their part; but it must be confessed that no organization has accomplished so much in so short a time as the American Health League, the outgrowth of the Committee of One Hundred of the Association for the Advancement of Science. The explanation of this is chiefly the composite character of its membership,—the fact that influential laymen of all walks of life are represented. The securing the insertion into the platforms of the two great political parties of a plank favoring the establishment of a national bureau of health and the personal indorsement of the same by both of the candidates for the presidency was a master stroke. While greatly aided by our own able and astute McCormack, certainly so far as the Democratic party is concerned, the chief credit, I am sure, is due the Health League. Politicians look askance at the demands of a single class of the population, and I seriously doubt if we sanitarians and doctors alone could have secured it, even if it had occurred to us to try. While we know that

planks in political platforms often prove very weak when we come to build on them, still the very fact that such a declaration has been made will be of much value in educating public opinion, but especially in its influence on members of Congress. Every politician claims to stand upon the platform of his party, and this will make it much easier to secure their support of the legislation we are seeking.

The practical question before us, however, is what is the wisest course for the Association to pursue in order to aid most effectively in obtaining the nearest approach to the national bureau of public health we desire that is in reach? Unquestionably, in my humble judgment, it is to definitely and positively indorse the Public Health and Marine Hospital Service, advocating at the same time its further enlargement by the transfer to it of such health agencies in other departments as legitimately come within the jurisdiction of such a bureau, and by new legislation.

By the establishment in 1901 of the Hygienic Laboratory for the "investigation of infectious and contagious diseases and matters relating to the public health," with its divisions of bacteriology and pathology, medical zoölogy, pharmacology, chemistry and scientific research, the public health functions of the Marine Hospital Service were greatly increased. These were further augmented by the passage in 1902 of "An Act to Increase the Efficiency and Change the Name of the United States Marine Hospital Service." By this act, changing the name to the "Public Health and Marine Hospital Service of the United States" and extending its scope, a national bureau of public health was established, imperfect and incomplete though it was, provision being made therein for the coöperation of the health forces of the country at large by requiring an annual conference of the Surgeon-General with delegates from the State and territorial boards of health. Yet more amplification is proposed in a bill "To Further Protect the Public Health and Impose Additional Duties upon the Public Health and Marine Hospital Service,"

which has passed the Senate and is now pending in the House of Representatives. This bill materially increases the scope and usefulness of the bureau, providing, as it does, more fully for the investigation of disease, the diffusion of the information thus obtained, the extension of the conference with the State health authorities by authorizing special conferences with representatives from not more than five States, with pay by the government, the appointment of a sanitary engineer and a legal adviser. Nothing is said in the bill, however, about payment by the general government of a *per diem* and of the traveling expenses of the delegates to the annual conference of the Surgeon-General with representatives of all the State boards of health, required by the act of 1902. I am unable to see the reason for this discrimination in favor of the special conferences as against the general. I believe it to be a mistake, for two reasons: first, because in many of the States the appropriations are so small as to preclude this expenditure, and it is just these backward States that are most in need of the inspiration that would come from the meeting, not only with the Surgeon-General, but with the leading sanitarians of the country. As a matter of fact, since the attendance has only on one occasion barely exceeded half of the States the conference has been incomplete. But the principal objection is that this kind of half-hearted invitation, this simple announcement that there will be a conference with the State boards, and that they can send delegates at their own expense if they wish to, fails to secure that feeling of interest and cordial coöperation that would result if the delegates realized that they were, in a certain sense at least, an actual part of the great national health machine. This feeling would be still further strengthened by the adoption of the suggestion made by Harrington in the address already referred to, that these delegates be appointed for a term of several years.

Fearing to impose too much upon your patience I have omitted reference to many other valuable features, but enough

has been said to show that we already have a bureau of public health of considerable proportions, one that only needs amplification and strengthening to make it the great bureau we have in mind.

But a second and more vital reason for the indorsement advised is, that if we refuse to accept the existing bureau we will, unless I am very much mistaken, get nothing. The repeated failures of the great American Medical Association to obtain a national department of public health with a secretary in the Cabinet have demonstrated the futility of that project; and any attempt to secure a new bureau against the combined opposition of the Public Health and Marine Hospital Service and the other departments involved, upon which we might surely count, would, I am confident, meet with the same sad fate. But if our own able committee on this subject, already appointed, and the similar committees from the American Medical Association and the Health League shall work harmoniously together and, after conference with Surgeon-General Wyman and the heads of the other departments that would be affected, securing in advance, if possible, their assent to the changes proposed, shall draw a bill that will appeal not only to the patriotism but to the common sense of the members of Congress, as being both sensible and reasonable, and clearly promotive of both efficiency and economy in the administration of the public health forces of the general government, I believe it would pass. I am confident that we can depend upon our committee to do what is wisest and best.

In conclusion I wish to say that I feel that we have good reason to take courage and go forward. The signs of the times are auspicious; the spirit of hygeia seems to be in the air, the people are waking up from their lethargy, and it is not too much to hope that we are now entering upon a period which will be known in the histories of our several countries as the Age of Hygiene.

REPORT OF THE JOINT COMMITTEE ON MAILING INFECTIOUS MATERIAL

The Committee has carefully examined Order No. 677 from the Postmaster-General, dated December 27, 1897, amending Order No. 88 of February 5, 1896, prescribing the conditions under which specimens of diseased tissues may be admitted to the mails.

The Committee makes the following recommendations:

The Committee recommends the adoption, without change, of so much of the general regulations as is given below.

Specimens of diseased tissues may be admitted to the mail for transmission to United States, State, or municipal laboratories only when enclosed in mailing packages constructed in accordance with the specifications hereinafter enumerated: Liquid cultures, or cultures of micro-organisms in media that are fluid at the ordinary temperature (below 45° C. or 113° F.) are unmailable. Such specimens may be sent in media that remain solid at ordinary temperatures.

Upon the outside of every package shall be written or printed the words "Specimen for Bacteriological Examination. This package to be treated as letter mail." No package containing diseased tissue shall be delivered to any representative of any of said laboratories until a permit shall have first been issued by the Postmaster-General certifying that said institution has been found to be entitled, in accordance with the requirements of this regulation, to receive such specimens.

Specifications for the construction of packages for safely conveying through the mails pathological specimens for bacteriological examination for diagnosis in cases of suspected diphtheria, tuberculosis, and other communicable diseases.

In regard to the transmission of specimens for the diagnosis of infectious diseases, the Committee recommends that special regulations be adopted for the specific diseases in question, both because certain of these specimens can be transmitted through the mails without danger and because the present regulations are not sufficiently intelligible or explicit to furnish a proper guide to boards of health. It will also be manifest saving to relieve boards of health

from the necessity of conforming to stringent regulations in transmitting relatively harmless materials through the mails. The Committee recommends amendment of the present regulations to read as follows:

1. TUBERCULOSIS. Specimens of sputum are to be transmitted in a solid glass vial, with a mouth not less than one inch in diameter, closed by a cork stopper or by a metallic screw top, protected by a rubber or felt washer. The glass vial to be contained in a cylindrical tin box; said box should be made of I. C. bright tin plate, soldered joints. This box to be closed by a metal screw cover and a rubber or felt washer or tightly fitting sliding metal cover. The glass vial contained in this tin box shall be completely and evenly surrounded on all sides by absorbent cotton closely packed. The cylindrical tin box with its contents shall be placed inside a larger cylindrical tin box prepared in exactly the same manner as the inner box previously referred to, excepting that the larger tin box shall be lined on the inside of the sides and bottom with compressed paper not less than three-sixteenths of an inch in thickness, in such a manner as to snugly fit the inside tin box.

Specimens of sputum received in carbolic acid shall be prepared as described for specimens not so treated, excepting that the outer tin box may be dispensed with.

2. DIPHTHERIA. Specimens containing material, removed by swab or otherwise, of secretions for diagnosis taken from persons suffering from diphtheria or suspected to be suffering from diphtheria shall be prepared as follows: If such material be transmitted for diagnosis upon the original swab, the infectious material shall be placed within a test tube and closely stoppered with cotton, to be completely surrounded by cotton and to be packed in a cylindrical tin box in the same manner as described for mailing specimens

of tuberculosis sputum, excepting that the outer cylindrical tin box may be dispensed with.

If specimens of diphtheria be transmitted through the mail upon blood serum, or other material used as a culture medium, the preparation of the specimen must be made in the same manner as required for tubercular sputum, excepting that a test tube, stoppered with cotton and the open end covered with a tightly fitting rubber cap, may be substituted for the glass vial specified above.

3. MALARIA AND TYPHOID FEVER. Specimens of blood transmitted through the mails for the diagnosis of malaria or for the diagnosis of typhoid fever by the Widal test may be transmitted in any strong mailing case which is not liable to breakage or to loss of the specimen in transit. Specimens of blood from a person suspected or known to have typhoid fever and transmitted through the mails in bile or other liquid medium shall be prepared as prescribed for specimens of sputum, excepting that a test tube closed by a rubber stopper, and either sealed with paraffine or covered with rubber cap tightly fitting, may be substituted.

4. OTHER COMMUNICABLE DISEASES. Specimens for the diagnosis of all other infectious or communicable diseases shall be prepared in the same manner as provided for tubercular sputum, excepting that a test tube prepared as hereinbefore provided may be substituted for the glass vial.

5. BUBONIC PLAGUE AND CHOLERA. The transmission of specimens through the mails for the diagnosis of bubonic plague and cholera is forbidden, excepting upon written authority of the Postmaster-General, and under such rules and regulations as he may prescribe.

6. PATHOLOGICAL SPECIMENS AND DISEASED TISSUES. Pathological specimens and diseased tissues taken from the bodies of animals or human beings may be sent under the same regulations which are provided as for the diagnosis of the diseases from which the human beings or animals are suffering, excepting in a case of typhoid fever in which the tissue or organ must be prepared in the same manner as provided for tubercular sputum.

7. SPECIMENS OF NON-INFECTIOUS TISSUES. Specimens of non-infectious tissues must be prepared in accordance with the regulations of the Post-Office Department for mailing liquids and perishable articles.

Respectfully submitted,

(Signed) MARSHALL LANGTON PRICE.
JOHN F. ANDERSON.

Municipal Health Officers' Section

IMPROVEMENT OF THE MUNICIPAL SANITARY INSPECTION SERVICE

By HENRY MITCHELL, M.D.
Asbury Park, N.J.

The hazy views and opinions which have in past years prevailed relative to the scope and detail of municipal sanitary operations have not yet been altogether dispelled, although a much clearer and better understanding of the limitations which should guide governing bodies in municipalities in their efforts to promote the comfort and convenience of citizens is gaining acceptance in progressive localities, and many communities are undergoing a process of emancipation from the conditions which prevailed in this country a half century ago, when the enforcement of sanitary laws and ordinances was intrusted to peace officers and political appointees, whose lack of knowledge of public hygiene was one of their most distinguishing qualities. The unwise and inconsiderate attempts to employ the machinery of the health department to right wrongs of all sorts and descriptions has, to a considerable extent, retarded progress, for in numerous localities ill-advised and unreasonable proposals to make use of the health board to abolish annoyances, redress grievances and effect social reforms, disregarding the absence of legal authority for such action, has occupied much of the time of sanitary officials, with none but negative results, and it is gratifying to observe the

progress which is now being made in the disentanglement of puzzling municipal problems, and the assignment of appropriate duties to the various branches of city government. Unquestionably certain defects in house construction have unfavorable influences upon morbidity and mortality, mainly, perhaps, because of insufficient provision for fresh air and sunlight, but so also have narrow and unclean streets, smoke nuisances, noise nuisances and other sins of densely populated districts; and yet experience has shown that the regulation and improvement of these conditions can, in the larger towns, best be effected by the governing body itself, through its appropriate committees or bureaus or departments especially created and equipped to deal with these questions. It should be enough for municipal boards of health to limit their operations to those measures which have for their direct and obvious purpose the protection and promotion of the public health, rejecting applications for action in the case of property nuisances and personal discomforts which cannot be shown to actually cause disease.

Doubtless sanitary officials have themselves been largely responsible for misguided activity, but a cure is effected when frequent conferences can be arranged with more experienced officers from other districts who, it may be, have gained wisdom by defeat in efforts to accomplish ends which, though perhaps highly commendable and desirable, can be lawfully attained only through other channels than those provided by the health laws.

When a source of infection has been unmistakably ascertained, as, for example, the transmission of the malarial organism by mosquitoes, or the conveyance of the typhoid bacillus by flies, the health department should specify the measures to be employed for relief, but not in all cases is it advisable that the service necessary for the removal or abatement of the nuisance shall be performed by or under the supervision of sanitary officers, for as soon as the experi-

mental stage in dealing with these and similar hygienic problems has been passed, the city should, as a routine service, cause the requisite labor to be performed to prevent a continuance of the nuisance and the consequent dissemination of the infection, having consideration only for efficiency and economy, and municipal health departments have been gradually released from the immediate supervision of the removal and disposal of excreta, waste fluids, garbage and rubbish, their energies being conserved for the detection of obscure sources of danger to the public health, the discovery and removal of which cannot be safely intrusted to unskilled agents.

It may be stated, as a general proposition, that action by sanitary departments for the abatement of nuisances prejudicial to the public health, except in cases of extraordinary emergency, should be conducted by application to the court for a restraining order directed against the offending parties, or by legal procedure for recovery of the penalty prescribed for violation of the local sanitary regulations, and individuals or corporations responsible for the creation or maintenance of a nuisance prejudicial to the public health should thus themselves be compelled to cause the necessary labor and materials to be furnished, at their own expense, and cause suitable and proper measures to be employed for the removal or abatement of the nuisance.

While the removal of unhealthful conditions is universally admitted to be of vital importance to the welfare of the city and State, politicians and taxpayers have not yet generally consented to select for this service, regardless of all other considerations, men of high mental endowments, and who have received an education and training adapting them to the practice of the speciality to which they are to be assigned, nor has the compensation for such services been generally fixed at a figure which will give to appointees in city health departments freedom from anxiety concerning domestic

considerations relating to house rent, food, clothing, etc., and leave them at liberty to devote their attention solely to official duties; but the diminished morbidity and increased longevity which have, in recent years, resulted from well-directed sanitary operations, particularly laboratory investigations, procedures for securing cleanliness in the collection and distribution of milk and for the extermination of insect carriers of infectious organisms, have aroused public interest, and have forcibly demonstrated the value of the unostentatious, faithful and efficient work of sanitary officials.

Men who have enjoyed the privilege of a medical education, preliminary to a comprehensive course of instruction in municipal sanitation, and have thus become masters of the various subjects which enter into the art of public hygiene, constitute the class from which the best services in preventing the spread of infectious diseases may be obtained; and it is from this class that executive health officers will finally be drawn.

In New Jersey the statutes and judicial decisions* expressly require that health boards shall confine their operations to the removal or improvement of conditions which affect the public health unfavorably, and under the laws of that State members of municipal boards of health are, in effect, jurymen, selected under the law to sit in judgment concerning conditions suspected to be, or which are known to be, injurious to the public health. Action was first taken by the State Board of Health of New Jersey for improvement in the grade of municipal sanitary officers in 1896, by the introduction of a legislative Bill. This Bill failed to pass. In 1897 further unavailing action was taken, and in January, 1898, upon the solicitation of the State Board of Health, the trustees of Rutgers College announced that examinations to test the fitness of applicants for appointment to serve as sanitary inspectors would be conducted quarterly, and

*See foot note, page 261, Revised Statutes of New Jersey.

that certificates of competency would be issued to those who were found to be qualified for employment in the work of local boards of health. Some progress was made under this arrangement, and in 1901 another legislative Bill to improve the sanitary service was introduced and lost. In 1903, however, a Bill for this purpose was enacted, and it became operative in 1905. Since that date regular semi-annual examinations have been held in Trenton by examiners appointed by the State Board of Health to test the fitness of persons desiring to enter the employment of local boards of health, and thus far 304 applicants have been examined, and 148 licenses have been issued as follows: For health officers, 54; for sanitary inspectors of the first class, 65; for sanitary inspectors of the second class, 4; for sanitary inspectors of the third class, 2; for meat inspectors, 4; for plumbing inspectors, 19. This movement has perceptibly raised the standard of municipal sanitary employees in New Jersey, but inasmuch as preparation for the examination is worked out separately by each applicant for license, the degree of proficiency of the various licentiates varies greatly, and the necessity for systematic instruction has been found to be imperative. Insurmountable obstacles have, however, thus far been met in providing a suitable course of training, and until higher salaries and a fixed tenure of office shall be provided, there seems to be little ground for expectation that suitable persons will be willing to incur the expense and undergo the labor incident to attendance upon the lectures and demonstrations which are essential to the acquirement of familiarity with the principles and practice of the art of public hygiene.

In other States, notably in Pennsylvania and New York, offers of instruction in municipal sanitation have been made, but the movement has not yet been successful. In England the Sanitary Institute has for many years supplied instruction for sanitary officers and students, and diplomas in public

health have been issued, after periods of post-graduate instruction, by at least fifteen universities and institutions of learning.

The medical inspection of pupils, teachers and janitors in public schools is a specialty which is best conducted under the supervision of the school authorities, for friction is liable to occur if the health department exercises authority over pupils and school employees during the school session and in school buildings, and as health boards have unlimited supervision over all persons who are affected with any communicable disease, and who are located in their own homes, it is undoubtedly advisable that school boards shall be held responsible for the care and safety of pupils while they are inmates of public school buildings. Moreover the compensation for medical inspection of pupils is properly paid from school funds, and furthermore regulations under which the work is conducted must be adjusted to produce a minimum of interference with the ordinary routine of instruction. The phrase "medical inspection of schools" appears to be misunderstood in some quarters, and it is sometimes construed to indicate that the inspection of public school buildings is a part of the duty of the physician who is appointed to the office of medical inspector of schools, but few, if any, of the medical men who are engaged in the detection of the onset or existence of infectious diseases, testing the vision and hearing of the children, and noting their physical condition and development, are qualified to correctly judge of the safety of the construction, ventilation, heating and drainage of buildings, and these questions should be dealt with by those departments of the local government which are especially constituted for that purpose.

All physicians do not realize that a medical training alone does not equip an individual to undertake the duties of the modern sanitary inspector, and as recently as the present year a member of the legislature of New Jersey (a physi-

cian) advocated an amendment to the sanitary licensing act of that State, the amendment being designed to exempt all physicians from the requirements of the prescribed examinations, and to permit all graduates in medicine to enter service as municipal sanitary inspectors and health officers without any preparation for the duties of these offices other than the study necessary to obtain a diploma in medicine. The amendment was defeated.

Finally, let me again draw attention to the great value of periodical conferences between executive sanitary officers, and to the influence which such conferences can exert in securing the adoption of tried and efficient sanitary measures; in obtaining uniform or similar action in adjoining districts and in securing popular approval and support. For even if the health officers in adjacent localities are equally industrious, zealous and well informed, very great differences will be observed in the degree of efficiency of the systems employed to attain the same ends, and frequent comparisons of procedures to determine which is most appropriate and effectual are therefore extremely desirable; and every municipality should extend to its citizens the benefits and advantages which result from the attendance of its chief health officer at gatherings of representatives of the health departments of other localities.

The proposed establishment of a new section in this Association, to be devoted to the study of subjects relating exclusively to questions concerning municipal sanitation, is an innovation which will doubtless be warmly welcomed by many who are seeking light, encouragement and inspiration.

THE RURAL HEALTH OFFICER

DR. CHARLES A. HODGETTS
Chief Health Officer of Ontario
Toronto, Ontario

The public expect too much of the medical man who is unfortunate enough to accept the position of Municipal Health Officer. They forget, or do not know, that public health is not all medicine, no more than it is the all of medicine.

The enforcement of the simplest health regulations brings him into conflict with some of the ratepayers to whom he looks for professional patronage.

As instances:

In the matter of the locating of a privy pit or closet upon a particular piece of property.

The deciding upon the manner in which some newly arrived Celestial shall dispose of his laundry slops upon premises which the owner, previous to his arrival in the community, has not been able to let for a pigsty, and in which only some itinerant beggar had found a temporary resting place, which premises, however, through love of gain minus consideration of public health, had to be let for human habitation.

The filthy slaughter-house and its accompaniment of raw offal and greedy hogs.

The piggery wherein city refuse was fed to swine, in turn converted into toothsome pork, etc., and sold in the city.

The retired farmer who carried into the village life the

evils of farm life so that they become a nuisance to dwellers around.

The rendering plant to which the city sends its waste material and dead carcasses, but because of the nuisances arising therefrom will not permit of the business being carried on in the urban district.

These are instances which the mind will readily multiply as examples of the rural officer's difficulties. It must be remembered, too, that he has to consider and settle these often without fee, gain here or hope of reward in this world, nothing but the ill-will of some one or more of the ratepayers he serves free in his public capacity.

In the discharge of such duties he becomes a loser financially. That rural municipalities do not remunerate is a condition which prevails. I have frequent assurances and appeal is often made where a physician, acting in an emergency for the benefit of his municipality, adopts means to prevent the spread of some contagious disease, and, finding it almost next to an impossibility to confer with the members of the local board until the lapse of several days, takes matters into his own hands, finds after liabilities have been incurred that either through penuriousness on the part of the health representatives of the municipality or by reason of some legal technicality, he has made himself personally liable for these services rendered on behalf of the public.

Under such circumstances and in view of the fact that in most instances the early initiation of preventive measures means a municipal financial saving, and also prevents the loss of life, minimizes suffering, and curtails embarrassment to the business life of the community, is it to be wondered at that medical men either refuse to accept the very honorable position of Municipal Health Officer or hesitate in the prompt enforcement of the law?

The state or provincial law which does not clearly define that the Municipal Health Officer shall be paid certain mini-

mum fees for services so rendered is certainly at fault, and the public have themselves to blame for this grievous oversight in the legislative oversight.

Even if provision is made, I am not certain but the general practitioner is not foolish in accepting the appointment, for certainly in my experience the acceptance of the office is suicidal to his best professional interests. Particularly is this the case when with the appointment, which in Ontario is by either by-law or resolution of the township, village of town council, his annual remuneration is set down at the miserable pittance of twenty-five dollars, or even less.

How often in a case of this kind has the well-meaning Municipal Health Officer found that long before the expiration of the twelve months he has brought down upon his well-meaning head the displeasure of council, local board and many of his former patients. He has brought no grist to his professional mill and received literally "the chaff" instead of the "flour" which means life to himself and family.

So frequently have instances of this kind occurred in Ontario in the some eight hundred municipalities that the opinion has been formed, and I have so advised medical men to refuse the appointment unless it is clearly defined either by by-law or resolution of the council the fees a medical man should receive for his official duties.

But the acceptance of this suggestion by medical men generally would mean a "strike," which would greatly embarrass public health work; this statement I accept, and would add the remedy is at hand, and in my opinion is one which would greatly enhance the importance of the office of Municipal Health Officer, and also result in a better enforcement of the laws. To be properly understood let me state that I am of the opinion the time has come in many of our more populous provinces and states for the creation of districts which would include a number of townships, villages and possibly a few towns, where the health laws should be

administered by a Municipal Health Officer who is paid an adequate salary and furnished with a properly equipped laboratory to intelligently and properly carry on his work; such a Municipal Health Officer to devote the whole of his time to the duties of the office, and, so that his appointment may have a possibility of continuity, such an officer's appointment should be subject to approval of the central provincial or state authority, and dismissal should only be for cause.

The creation of such an office would not abolish the appointment of local township, village or town boards, or of local minor health officers, such as inspectors or sanitary police. Such boards and officers would be continued; their duties and functions would be greatly enhanced, and as a consequence health work generally placed upon such a working basis as is not the case under the conditions at present existing, and from the medical standpoint the minor frictions, which unfortunately exist, would be removed, for the District Municipal Health Officer would serve as an impartial administrator. He would be the health confidant of all doctors in the district, who would be in close touch with a health expert, one alike familiar with the medical aspect as well as other matters incident to public health, one who by reason of his not being in professional practice would be more likely to smooth difficulties, if not prevent many such as are frequently the case at present.

Many inestimable advantages, both to the medical profession and the public, will suggest themselves to the hygienist consequent upon the establishment of such a condition as briefly outlined in this paper, many of which are at present only to be found in the state or provincial office.

The proposed change is a radical one, but it is in the highest interests of the public and, notwithstanding the financial considerations incident thereto, will be adopted in general principle. Just in the same manner as the Municipal Health

Officer of a large city devotes his time to the duties of office, and with a well-equipped staff enforces health laws for the general good without fear or favor, so the District Medical Health Officer, with several local boards of health in each municipality therein, having its sanitary officials who would act within their own limits under his direction and supervision, would be able to administer wisely and well, promoting sanitation in all its branches where now it is imperfectly enforced or unobserved.

Laboratory Section

PROGRESS REPORT OF THE COMMITTEE ON STANDARD METHODS FOR THE BACTERIAL EXAMINATION OF WATER AND SEWAGE

Your Committee, in presenting its first report of progress, has found it impracticable to consider any positive changes in the present methods of examination, owing to the short time since its organization. It has been thought desirable, however, to suggest lines of experimental work to be carried on during the coming year which will tend to bring about such changes or modifications in the methods which were presented by the Committee on Standard Methods of Water Analysis in 1905.

As new methods and modifications are proposed and proven to be effective in the bacterial examination of water and sewage, material changes will of necessity be required, but no radical departure from the standards laid down should be made without thorough and exhaustive tests and due deliberation. The Committee suggests the following matter to be considered and if possible decided upon during the coming year.

QUANTITATIVE BACTERIAL TESTS.

In routine laboratory work the three media which should be used in standard quantitative tests on water and sewage aregelatin, agar and litmus lactose agar. One, two or all three of these media may be employed as the circumstances require.

GELATIN. No gelatin media should be employed having a melting point below 25 degrees C. The percentage of gelatin added may be increased to bring the melting point up to the desired figure. With most gelatin on the market eleven per cent seems to be preferable to the standard of ten per cent, providing the gelatin is weighed out without correcting for contained moisture, as appears to have been the custom. Recent unpublished work by a member of the Committee shows that ten per cent or even twenty per cent of moisture commonly occurs in laboratory gelatin, and that unless this is deducted in weighing, the stiffness of the media is materially affected and the bacterial results obtained considerably modified. It is suggested that 100 grams of gelatin per liter be employed and that all gelatin be tested for moisture before using by drying a sample for half an hour at 105 degrees C. The stock should be kept under uniform conditions in tight containers, so that the percentage of water present may then be properly accounted for and the weight on a dry basis be used in making up the medium.

Between steps 8 and 9, Standard Methods, page 108, the media should be titrated and adjusted to the final reaction of +1.0 per cent.

Step 12, in place of "Adjust," read "If necessary, again adjust."

AGAR. Several experimenters have recommended 10 grams of agar per litre instead of 15 grams. The smaller amount seems to be sufficient to carry the added water and the medium is less stiff. This appears to give higher and more consistent counts. Between steps 8 and 9, Standard Methods, page 108, the media should be titrated and adjusted to the final reaction as in the case of gelatin, so that all cooking takes place under standard conditions. This appears to give more uniform results and a clear, bright appearing agar. Page 108, step 13, change "Boil two minutes" to "Boil five minutes."

It is well to determine the reaction of the media after sterilization, as during this process the reaction often changes and the final results should correspond to the acidity recommended by the standard methods. What has been said regarding the necessity of correcting for moisture in gelatin applies with equal force to agar and for the same reasons.

LITMUS LACTOSE AGAR. The azolitmin on the market varies considerably, much of that sold being entirely unreliable for the purpose. A one per cent solution of Kahlbaum's azolitmin, if boiled for five minutes, readily dissolves and needs no correction for acidity if added to standard agar. Many bacteriologists prefer pure litmus to azolitmin, and it is therefore suggested that its use be made optional. Both total and red colonies may be counted after from 18 to 24 hours when incubated at 40 degrees C. Such tests are particularly valuable in the control of filtration plants.

STERILIZATION. Sterilization in the autoclave seems to be preferable to that in flowing steam. Both in the lowering of the melting point of gelatin and in the breaking down of sugar media the time of sterilization has a greater effect than does the temperature within the standard limits. It is, therefore, suggested that small containers be used and that gelatin and all sugar media be sterilized in an autoclave at 120 degrees C. for 10 minutes and other media at 120 degrees C. for 15 minutes.

An important point in the sterilization of gelatin and sugar media is to have the sterilizer hot when the media is introduced, so that heating to the point of sterilization will be accomplished as quickly as possible. Also when sterilization is complete the media should be cooled rapidly. This not only reduces the time of heating, thus preserving the gelatin and the sugar, but also assists in the actual sterilization.

Standard Methods, page 14, par. 3, line 3: Change "115 degrees C." to "120 degrees C."

PLATING. Better and more consistent results appear to be obtained when 6 c.c. of agar or gelatin are used in the standard Petri dish, than when 10 c.c. are employed as recommended. The trouble from spreaders is lessened, smaller tubes may be used, thus economizing storage, and a considerable saving in the amount of media is also effected.

INCUBATION. With the lactose bile media the temperature of incubation seems to be best set at 37 degrees instead of the standard of 40 degrees set for agar and dextrose broth. The general use of a temperature of 40 degrees instead of 37 degrees is a matter which requires further study. On page 110 of the Standard Methods, 40 degrees C. should be used instead of 37 degrees in order to correspond with the temperature previously recommended on pages 84–92, inclusive.

PRESUMPTIVE TEST FOR *BACILLUS COLI*. It is now well understood that, to be of value, the test for *B. coli* must be quantitative or at least relative numerical values must be obtained. It is, therefore, essential to plant the fermentation tubes in varying amounts, using ten, one, and one-tenth c.c. for water, and smaller quantities for sewage and sewage effluents.

The dextrose broth solution now in use often gives positive results with gas formers other than *B. coli*. On the other hand, in impure waters and in sewage the results are often negative when they should be positive, due to overgrowth.

It is recommended that the lactose bile medium be employed as a standard for impure water and sewage work, and that the two fermentation media be optional in tests on waters of greater purity.

In the fermentation test with dextrose broth the absorp-

tion of carbonic acid gas is more comfortably made by a concentrated solution of sodium carbonate rather than by the sodium hydrate recommended. The results are precisely the same and the solution does not corrode the hands. Absorption tests are, however, unnecessary with lactose bile, and the majority of bacteriologists appear to have discontinued them even when employing dextrose broth.

The lactose bile medium consists of sterilized undiluted fresh ox gall (or an eleven per cent solution of dry fresh ox gall) to which has been added one per cent of peptone and one per cent of lactose. The addition of peptone is important.

SPECIAL TESTS FOR *B. COLI.*

The majority of our correspondents feel that the tests for morphology and motility can be well omitted, as only about one culture in a thousand which has passed the cultural and biochemical tests would fail on these tests.

When the culture has been isolated from a litmus lactose agar plate, the test for the coagulation of milk should be omitted, as actual records show that not one culture in the thousand isolated under these conditions fails to give the milk test.

About one out of every four non-typical cultures, which give a negative test for gas production, indol or nitrate reaction, will show a positive test if repeated on the same culture. For this reason all non-characteristic tests on these media should be repeated before reporting.

There appears to be an error in stating the proportion of peptone to potassium nitrate in the nitrate broth. The usual proportions are 0.1 per cent of peptone and 0.02 per cent of potassium nitrate, the latter being stated as two grams per liter, or ten times the usual amount.

PRELIMINARY CULTIVATION.

The period of preliminary cultivation should in each transplantation be shortened to 24 hours in order that the culture may attain its greatest degree of vitality.

PUTRESCIBILITY TEST.

Experiments recently performed using methylene blue, methylene green and indigo carmine on sewages, effluents and mud deposits from water and sewage seem to show that the use of the double zinc salt of methylene green at a temperature of 37 degrees gives the quickest and most satisfactory results. The bottles used are 250 c.c. in capacity, ground for glass stoppers, but used with rubber stoppers. Through the perforation of these stoppers is a glass tube having a 5 c.c. heavy rubber bulb on the end. After the bottle is filled and the stopper placed in position, the bulb and the tube are also filled and the excess of water is pressed out below the rubber bulb, leaving it in a collapsed condition. A provision is thereby made for expansion when the liquid is heated to 37 degrees C. in the incubator.

DESCRIPTION OF SPECIES.

Several of the Committee have suggested the adoption of the numerical method of describing species recommended by the Society of American Bacteriologists, and a study of this method will be undertaken during the coming year.

The descriptions, and even the names, of many common species of bacteria are badly confused. Much comparative study in different laboratories must be made in order to at least partially systematize the descriptions of the characteristics of these species and to assign to them the names originally given them.

Respectfully submitted,

DANIEL D. JACKSON,

Chairman.

PROGRESS REPORT OF THE COMMITTEE ON STANDARD METHODS OF CHEMICAL ANALYSIS OF WATER AND SEWAGE

The Committee on Standard Methods of Chemical Analysis of Water and Sewage submits the following report of its work:

It was the consensus of opinion at the Atlantic City meeting last year, that a new edition of the present Standard Methods report should be issued in the near future and that preparations for that work should be begun at once. Accordingly your Committee has begun the work of collecting information and data looking toward such a revision during the coming year. In order that the work might be undertaken with a full knowledge of existing conditions the following information was desired:

To what extent are the present standard methods employed in the water laboratories of the country?

In the case of those determinations for which standard methods have been described, to what extent are other methods or modifications employed, and for what reason are they employed in preference to the standard methods?

What determinations, if any, are in general use in water laboratories for which no standard methods of procedure have been described?

A circular letter asking for the above information, for any additional information which would assist the Committee and for offers of assistance in trying out new methods was mailed to all members of the section having any connection with water work.

The replies have been general and encouraging. The present standard methods for chemical analysis are in general use, at least among those laboratories represented in this section. As a general rule the methods are followed as laid down or with occasional minor and non-essential modifications. Where serious departures from the standard methods are reported they are as a rule attributed to a disinclination to change from methods which have been employed for some time in the past and upon which permanent and continuous records have been founded. A few alternative methods have been recommended as improvements in the existing methods. These will be summarized later.

By far the largest number of suggestions are in the line of additional methods. There is an urgent demand from many sources for a set of methods for the complete mineral analysis of water. Methods are also desired for the analysis of commercial alum, copperas, lime, soda ash and other materials used in the treatment of water.

Offers of coöperation have been freely made and will be availed of during the coming year in the comparative tests which are proposed.

It is the opinion of the Committee that the following points should be specially considered in the preparation of the final report.

A satisfactory index.
Methods for complete mineral analysis.
Rapid methods of analysis for filter control and field methods.
Methods for the analysis of commercial materials used in water and sewage treatment.
Fuller treatment of the subject of indicators, especially in connection with CO^2 and iron and aluminum work.
Interpretation of results.

The Committee is now prepared to proceed with its program as follows:

All proposed changes which appear to possess any merit whatever will be outlined in this report. It will not be possible to give new methods in detail but sufficient indication of the character of the method will be given. Recommendations which may come into the hands of the Committee during the remainder of the year will also receive attention. It is proposed to institute a careful comparative test of all points at issue, whether they be matters of minor detail or totally different methods. Advantage will be taken of the many offers of assistance already received and the Committee will welcome others. Members are asked to specify what kind of work, if any, they prefer. In this manner it is hoped to obtain the most reliable information possible as to the relative merits of the various alternative methods available. This arrangement also has the advantage of leaving the final decision as to what form the standard methods shall take in the hands of those water chemists who are most interested in each branch of the work and best qualified to select the most advantageous procedure.

Suggestions which have been made in relation to changes in the present methods and addition of new material are as follows:

CHANGES SUGGESTED.

TURBIDITY:

Silica standards as now prepared require considerable skill, time and patience in their preparation. Levy has recommended the use of precipitated Fuller's earth as a satisfactory substitute.

In sewage. Recalibration of the standard candle turbidimeter for coarse material such as is met with in sewage work.

Suspended solids. Point of distinction from colloidal matter and questions of how this is altered by use of papers of various grades, asbestos mat or Berkfeldt filter.

FREE AMMONIA:

The method of direct reading has been improved and is in quite general use in sewage work. Comparisons will be made with a view to establishing this method on a better footing.

Permanent standards employing potassium bichromate in place of platinic chloride have been successfully used.

ORGANIC NITROGEN:

The present method of distilling off the free ammonia and determining the nitrogen on the residue is not compatible with the method of direct reading of free ammonia. A certain amount of nitrogen would escape detection by either process. It is not so essential to draw a hard and fast line between free ammonia and organic nitrogen as it is to use a combination of methods for these two determinations which will include all the nitrogen without overlapping.

Two alternatives are possible.

Determine the free ammonia by distillation and the organic nitrogen on a sample similarly distilled or preferably upon the residue from the free ammonia distillation.

Determine the free ammonia by direct reading and the sum of the free plus organic by the Kjeldahl; organic by difference.

The question of the direct reading of the Kjeldahl digestates will be considered.

NITRATES:

The present methods are not satisfactory in sewage work. Two new methods are available for study and comparison. One is the Brucine method of Noll (Ziet f. ang. Chem. 1901, XIV, 1317) as modified at the Sewage Experiment Station of the Institute of Technology. The other is a similar method as yet unpublished, submitted by McRae of the Baltimore Sewage Testing Station. This method employs the alkaloid narcotine and is very delicate.

Dissolved oxygen: A colorimetric method has been proposed by Pratt and Stabler.

COPPER:

The present method for the determination of copper alone in water is long and difficult. An electrolytic method has been described which is submitted for comparison. (Phelps, Jour. Amer. Chem. Soc., XXVIII, 1906, 368.)

HARDNESS:

The necessity for the use of calcite is questioned as being too great a refinement for a comparatively unsatisfactory method. The use of pure sodium oleate in making up the soap solution is a possible improvement which will be investigated.

Incrustants: The present method is not accurate. A determination of Mg. and Ca. is recommended.

Free lime: The silver nitrate test is in wide use. It requires further study and standardization.

ADDITIONAL MATTER.

The subject of the mineral analysis of water will be gone into fully and all the present methods will be the subject of careful study. It is hoped to make use of the methods of limestone analysis adopted by the American Chemical Society as far as possible. This will be the most difficult part of the work and the Committee will welcome offers of assistance in this line.

MANGANESE:

A method published by Weston and an unpublished method submitted by G. H. Pratt are available for comparison.

HYDROGEN SULPHIDE:

This is an important determination in sewage work which should be added.

FREE CHLORINE:

An unpublished method for the estimation of small quantities of free (available) chlorine is at hand and will be of value in connection with work on the disinfection of water and sewage. It depends upon the oxidation of o-tolidin.

ALUM:

A method for the analysis of crude alum is submitted. Other methods are available, and methods for the analysis of other crude materials used in water and sewage treatment will be obtained. Standard specifications for these materials are needed, and these must be preceded by standard methods of analysis.

SEWAGE SLUDGE:

Special methods of analysis are required.

WATER:

Rapid approximate methods for filter control.
Methods available for field assay.

PUTRESCIBILITY IN SEWAGE WORK:

This is one of the most important items in the present scheme of analysis for sewage effluents. A standard method of procedure is urgently needed. The methylene blue test has given general satisfaction wherever used, and is recommended for detailed study as the most promising of the putrescibility tests.

EARLE B. PHELPS,
Chairman.

COMMITTEE ON BACTERIAL MILK ANALYSIS

REPORT OF PROGRESS

ABSTRACT.

The Committe on Bacterial Milk Analysis respectfully submits the following report relating to research work on the various problems concerning which no procedures were recommended in the preliminary communication:

It is realized that methods of analysis must always be subject to change and improvement, and since some of the questions involved were of such a nature as to require an immense amount of research, the Committee deems it wisest at this time to report in some detail the work done during the present year, without making final recommendations.

As a Committee we reiterate such recommendations of our preliminary communication as are unaffected by this report, and request that they be adopted by laboratories doing milk work, thus developing so far as possible uniformity of technique and of interpretation.

We wish to express our thanks to those who have assisted in this work and to voice the hope that the spirit of coöperation they have shown may prove contagious among all laboratory workers.

MEDIA. The Committee still recommends for routine work 1 per cent agar reaction +1.5, made otherwise according to the recommendations of the water committee.

The work done on media during the year is summarized as follows:

1. Determination of degree of acidity in media best for the highest bacterial count in milk.[A]

Two hundred forty tests or 960 plates were made comparing agar media made with +.5, +1.0, +1.5 and +2.0 degrees acidity.

Media with reaction of +1.5 showed consistently the best results.

2. Determination of per cent of lactose in media best for the highest bacterial count in milk.[A]

Ordinary agar media was used containing 0, 1, 2, 3 and 4 per cent of lactose respectively.

Two hundred seventy tests or 1,300 plates.

It seems fair to conclude from these tests that for work at 37° C. agar with no lactose is better suited to the growth of milk bacteria than agar with lactose. At 21° C. 1 per cent lactose gave better results.

3. Determination of peptone in media best for the highest bacterial count in milk.[A]

Ninety tests or 270 plates indicated the superiority of 3 per cent peptone, but work now being done in duplication of these tests does not give parallel results.

4. The comparative efficiency of whey, ordinary and 4 per cent lactose agar for highest counts of milk bacteria, lactic organisms.[A]

Sixty-nine tests or 207 plates. Seventy-four of these plates are given first place as 5 had equally high counts. Of these 74 ordinary agar had 28, whey agar 24 and lactose agar 22.

Of associative organisms, not lactic, we have 18 tests or 54 plates in which lactose stands first 8 times, ordinary agar 6 and whey agar 3.

5. Whey agar compared with ordinary agar.[A]

Of 109 tests made with lactic microörganisms 77 or 70.64 per cent grew best on whey agar.

Of 105 tests with milk organisms other than lactic 63 or 60 per cent grew best on ordinary agar.

Of 48 "composite" tests 42 or 87½ per cent grew best on ordinary agar.

Of 23 germs other than lactic isolated from milk all but 6 or 73.9 per cent favor ordinary agar.

The conclusion is drawn that whey agar favors the growth of lactic organisms, and ordinary agar the growth of organisms other than lactic found in milk, and that for the determination of the number of bacteria in milk ordinary agar would be most useful.

6. Dextrose litmus agar compared with lactose litmus agar.[B]

One hundred six tests at 20° C. and 104 at 37° C.

Dextrose showed a higher count of red colonies at both 20° and 37° C.

Lactose showed a slightly higher count of blue colonies at both 20° and 37° C.

Dextrose stands a little higher on the total count at both 20° and 37° C.

With the 37° C. incubation lactose stands best at 24 hours, and dextrose better at 48 and 72 hours.

As far as the total counts are concerned there seems to be little choice, the advantage of dextrose being in the higher count of the acid colonies.

7. Comparison of litmus lactose agar at 37° C. and litmus lactose gelatin at 20° C.[C]

Of 25 tests gelatin gave the highest count in 18; agar in 7. Where gelatin shows the higher count the percentage of difference is much greater than where agar showed the higher number. The differentiation of species or types seems much

better in gelatin, but there is a considerable loss of plates from liquefiers.

Comparison of above both grown at 20° C.,[c] 24 tests, gelatin stands first in 14 and agar in 10.

A comparison of these two series of tests would seem to indicate that the temperature of incubation has more effect on the number of colonies than the medium used.

8. Comparison of beef peptone gelatin plates at 20° C. to 22° C. for 72 hours with beef peptone agar plates at 37° C. for 24 hours.[D]

In this series of 24 comparisons gelatin stood first in 18, agar in 4, equal results were obtained once, and in one the gelatin liquefied. The total gelatin count was over double that on agar.

The higher counts on gelatin must be largely attributed, (1) to the method and time of incubation; (2) the larger growth of the colonies of the lactic acid bacilli.

INCUBATION. The work done by various persons on media included in most instances research on incubation also, most of these tests being made in comparison of 20° C. and 37° C. for varying period of time; 591 tests, 3,349 plates. (One worker[E] submitting incubation comparison only.)

Summarizing the work on incubation we may say that the weight of evidence is against 24 hours' incubation at 37° C., and two days' incubation at or around 21° C., the number of colonies obtained being too small for a fair idea of the number of bacteria in the sample.

Eight-day and ten-day incubations at 21° C., while giving a slightly higher average count, have disadvantages, such as delay in reports, accumulation of plates and drying out of media, which render them undesirable for routine work.

The lines of highest efficiency on a working basis would seem to rest on a 48-hour incubation at 37° C. and a five-day incubation at 21° C.

It would seem advisable to recognize as standard both of these methods of incubation (it being understood that carefully regulated incubators should be used).

Board of health regulations governing the number of bacteria allowable in milk should state the method of incution to be used in examination, and in all reports, papers, etc., on the bacterial count of milk this factor should be explicitly stated.

Comparison of Ordinary Agar Plates, Inverted and Placed Under a Bell Jar; Agar Plates with Glycerine and Agar Plates with Earthenware Tops.[p]

Method. Beef peptone agar of the same make was used in the following tests. All plates were incubated in an insulated chamber in which a three-gallon pail, filled to the top with water, was kept. One set of plates was placed upside down under a small bell jar in the incubator. A second set of plates was inverted, and a strip of blotting paper, upon which a large drop of glycerine was placed, was laid in the lid of each Petri dish and placed in the incubator. The third set of plates was covered with Hill's earthenware tops and then incubated. Following the advice of Hill, thesetops were never washed, but always sterilized before use. The results of these experiments seem to indicate that the agar plates with glycerine prepared in the above manner are slightly more reliable than the earthenware tops.

The principal objections to the latter are:

(1.) They scratch the glassware.

(2.) The plate has to be uncovered for examination.

(3.) They are more liable to dry out if kept longer than 36 hours.

The Microscopic Estimate of Bacteria in Milk.

Several laboratories are now making this examination as a routine procedure. One worker,[f] who has done considerable experimentation along this line during the past year, sums up his results in attempts to actually approximate plate counts as follows:

"The method seems to be fairly satisfactory for milks, the bacterial content of which is not too low or too high; when the numbers are down below ten thousand the method seems to be quite inaccurate, and when the numbers run up into the millions I find also the numbers are not very reliable. Within the limits of from thirty thousand to three hundred thousand, however, the method seems to be fairly good. My general feeling is that a direct microscopic method might give an idea as to whether the sample is very good or very bad, but would not replace the plate method of examination in determining actual numbers and would be of no use for the examination of samples of milk, whose number of bacteria is quite low."

Another,[g] who has done much work with this method, finds it chiefly useful as a preliminary test, not plating samples which are shown by the microscope to contain less bacteria than the city regulation permits; in those samples which are plated it serves as a guide for the proper dilutions. He finds it possible with this examination to correctly state in nearly every instance when a milk contains less than 50,000 bacteria to a cubic centimeter or when it contains over a million bacteria to the c.c. On actual estimates within 50,000 of the plate count his average on counts is 66 per cent correct on counts between 50,000 and 500,000, and 50 per cent correct on counts between 500,000 and 1,000,000.

EXAMINATION OF MILK FOR B. COLI has become a routine procedure in some laboratories, the number of *B. coli* present seeming to some degree a more exact index as to the care of the production than the total bacterial count. In Baltimore[n] routine examinations are made for *B. coli* in milk in one one-thousandth c.c. of each sample.

One c.c. of the one one-thousandth dilution is placed in ordinary ox bile containing 1 per cent lactose in a fermentation tube and allowed to stand at 37° C. for 72 hours, at the end of which time, if there is more than 15 per cent, gas plates are made, colonies isolated and run through species tests. Of many hundred examinations the colon bacillus is found in about 25 per cent of the samples in winter and 75 per cent in summer in one one-thousandth of a c.c.

A new fermentation tube has been devised by Dr. T. M. Wright, using an ordinary U tube with a rubber stopper for the closed end. The advantages claimed are, (1) cheapness; (2) ease of cleaning; (3) breakage reduced to a minimum; (4) they occupy less incubator space, especially when proper racks are provided.

Æsculin bile salt media has been recommended[p] as a presumptive test for the detection of *B. coli* in milk. The preparation of æsculin is said to be easy, and different lots are very uniform in composition.

The method is given as follows: Weigh out

1 or 2% of Witte's peptone.
.5% sodium tamocholate (commercial).
.1% æsculin.
.05% iron citrate (ferric).
100 c.c. tap water

After steaming 15 to 30 minutes the medium is filtered, filled into fermentation tubes and sterilized.

For æsculin agar 1.5% agar is used, being dissolved in

part of the water, after which the other ingredients are added, the medium brought to a boil, filtered, tubed and sterilized.

Colonies of *B. coli* in media containing æsculin are black with a black halo, and can be readily counted against a white background.

Some other organisms give the reaction, notably *B. lactis aerogenes;* both may be counted on the plates, and on account of the different character of their colonies separate counts may be made of each.

Comparison of fermentation tests of milk with the addition of carbolic acid, and milk with the addition of bile salt and neutral red.[D]

Method. Ten c.c. of the samples of milk was pipetted into each of three sterilized tubes. To one tube .3 c.c. of a 5 per cent solution of carbolic acid was added; to the second tube 1 c.c. of a sterilized 2 per cent solution of bile salt containing neutral red in sufficient quantity to give the milk a deep pink color; and the third tube was kept as a control. All tubes were incubated at 37° C., and the results recorded at the end of twenty-four hours.

Without recording the results in detail we may briefly state that the tubes containing the carbolic acid and neutral red bile salt gave the most striking results for gas producing bacteria, as the chemicals used evidently inhibited the growth of the lactic acid bacteria more than the gas producing bacteria. The best results were furnished by the neutral red bile salt. Gas production was clearly demonstrated, and if the bacteria producing gas were in large numbers, the deep pink of the milk was changed to canary yellow.

Comparison of æsculin bile salt agar and neutral red bile salt for quantitative and qualitative examination of the coli and aerogenes groups.[D]

Method. The medium neutral red was made up according to the directions of Grünbaum and Hume; the æsculin agar, according to the recipe given by Harrison and Van der Leck.

In nearly every instance there were more bacteria of the coli group counted on the neutral red bile salt agar plates, due to the *great difficulty* in deciding which were coli-like colonies. Over fifty coli-like colonies were subcultured for complete identification, with the result that only 67 per cent were found to be *B. coli* or *B. aerogenes*. On the other hand, although we have subcultured for complete identification over a hundred colonies from the æsculin bile salt agar plates, we have found only *B. coli* or *B. aerogenes*.

In consequence of these results we should suggest that the æsculin bile salt method be given a trial by all workers who make many routine milk or water analyses.

Wisconsin Curd Test.[I] "Work done with this test for detection of fecal matter shows that positive results can be obtained from other gas formers than *B. coli*.

"The advantage of the test is that it is simple to perform in the dairies and very quick in its results, determination being made over night. The disadvantage is that while it is a valuable indication it is by no means a sure test for the presence of fecal matter."

TUBERCLE BACILLI IN MILK.[J] Collection of samples and technique.

(The Committee refers to the technique recommended by Anderson of the Hygienic Laboratory, Washington.)

LEUCOCYTES.[K] The value of a leucocyte count in determining the sanitary quality of milk.

Daily morning and evening leucocyte counts are being made (Doane-Buckley method) on the milk of two normal cows during the whole period of lactation, the work having been carried on for several months but not yet finished. The animals have been kept under exactly similar conditions and on regular feed; they have been carefully watched and subject to frequent inspection by a competent veterinary

surgeon, and during the entire period, to date, have been in perfect health. Remarkable variations in the leucocyte count from milking to milking have been found without demonstrable cause.

A new sedimenting tube has been devised by Stone & Sprague, for which they claim the following advantages over the ordinary tube:

1. It measures more accurately the sediment.
2. Smears of the sediment can be made in the same manner as with the Stewart tube.
3. The column of sediment tends to become stratified, so that different elements can be easily made out.
4. The tubes are much more easily cleaned out. With these tubes they have been able to detect cases of acute mastitis when the milk was diluted thirty times with ordinary milk, a mastitis sediment practically always showing a yellowish or pinkish tinge of pus mixed with a smaller or larger amount of blood. They recommend supplementing such tests with examination of the herds.

Artificial Production of Leucocytes in the Cow's Udder.[2] Up-to-date work along this line has been confined to a study of the effects which result from the injection of varying amounts of sterile solutions into the different quarters of the udder. Thus far distilled water, a two per cent aqueous solution of boric acid and a physiological salt solution have been used; experiments have also been made with the injection of cultures of certain pyogenic organisms.

In all cases a marked leucocytosis resulted; in some instances the leucocyte count being increased to twenty-five million cells per c.c. of milk. Also invariably fibrin was found, especially when the garget was at its height. Beside leucocyte determinations, quantitative bacterial determinations were also made. These revealed a rather interesting phenomenon, for as the leucocyte content increased the bac-

terial content seemed to diminish, presumably due to an increased phagocytosis.

Acid determinations upon the milk from the injected and uninjected quarters indicated that with the higher leucocyte content a lower percentage of acidity is obtained. This, no doubt is due primarily to the increased diffusion of the slightly alkaline blood serum into the milk.

The acid determinations were usually made within an hour after withdrawal of the milk, so that the acidity could not be attributed to bacterial activity.

Apparent Increase in Number of Leucocytes in Pasteurized Milk.[M] As previously shown[L] the heating of milk gives a much higher count with the Doane-Buckley method than is obtained with the same sample unheated.

A large number of tests made on milk before and after *pasteurization*, using the smeared sediment method, shows a very noticeable increase in the leucocyte count obtained from the pasteurized milk. Often milks which before pasteurization passed as normal showed great increase in the number of leucocytes sedimented after pasteurization.

It is the opinion of the Committee that milk having high leucocyte content, unless accompanied by other indications of inflammation, such as blood or virulent organisms, should not be condemned as unfit for use on the laboratory findings alone. Such milk may be regarded with suspicion and the laboratory findings may well serve as a guide for veterinary inspection.

F. H. SLACK, *Chairman.* F. C. HARRISON.
W. H. PARK. C. E. MARSHALL.
B. H. STONE. H. L. RUSSELL.

A C. E. Marshall, with Miss Northrup and Miss Farrand.
B P. G. Heinemann.
C W. A. Stocking.
D F. C. Harrison, with J. Van der Leck.
E C. E. North.
F H. W. Conn.
G W. M. Campbell.
H W. R. Stokes and T. M. Wright.
I D. D. Jackson.
J J. P. Anderson.
K B. H. Stone and L. P. Sprague.
L H. L. Russell and C. Hoffman.
M B. R. Rickards and W. M. Campbell.

Vital Statistics Section

NOTE.

Copy from Vital Statistics Section not received in time for publication in this issue. — EDITOR.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

OCTOBER QUARTERLY MEETING

Boston, Mass.

The quarterly meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boylston Street, Boston, on Thursday, Oct. 29, 1908, Vice-President Durgin presiding.

The following were elected to membership:

E. H. TROWBRIDGE, M.D., of Worcester.

J. J. CARROLL, M.D., of Holyoke.

EVANGELINE WILSON YOUNG, M.D., Chairman Committee of Public Health of the Woman's State Medical Society of Massachusetts.

LOUIS H. RICHARDSON, of New Bedford.

EDGAR H. GUILD, M.D., bacteriologist, of Springfield.

REPORT OF THE COMMITTEE ON THE FLY NUISANCE. The Committee has held two meetings at which the phases of the subject were considered, one on September 24 and the other on October 26. It presents the following suggestions for a form of circular to be circulated among boards of health, and accompanies the same by this preamble:

The information that is available with reference to the exact breeding places and habits is comparatively scanty. There are many entomologists who would gladly make observations if their attention were called to the need of such

facts as they can secure. Boards of health will confer a service on the public and will further such efforts as this by making known to students the need of this kind of information.

The question of the distribution of flies is little understood. A few investigations only have been made, yet by setting fly-traps and other simple observations much valuable information may be secured.

The mosquito has been closely studied and remarkable results have been obtained.

The Committee believes in making it known that the scarcity of flies in a given place is a good measure of the cleanliness of that place.

Closely allied to the main question is that of foods exposed for sale. The Committee believes that the time is ripe when such questions as the screening of fruit and foods to be consumed raw may be discussed. The Committee believes that such articles should be protected from the dust of the street and from flies. Candy and fruit bought at the stand on the corner of the street will insure to the consumer his full peck of dirt.

Another matter to which the Committee gave much attention is the proper care of the compost heap and the privy. With reference to the former, more attention on the part of the boards of health to the condition of barns and barnyards would result in a betterment of the conditions. With reference to privies, it is possible to improve the conditions in the outer districts of cities by insisting that connections be made with the sewer when there is a sewer in the street. When there is no sewer, the board of health should see that the privy vault is made fly-proof.

One of the matters related closely to the fly question is the regular and frequent collection of garbage. The present methods show that reform is needed. Garbage ought to be collected daily in hot weather in cities. Dumps have usually

garbage in them and may be good places for the flies to breed. They should be inspected strictly.

The Committee recommends the following circular for the discussion of the Association.

(Signed) C. V. CHAPIN, Providence, R.I.,
Chairman.

BEWARE OF FLIES

Flies are filthy insects. They drink from the cesspools, and dine in the privy vaults. They eat the sputum on the sidewalk, and revel in the garbage pail. They swarm on the baby's diaper, and are greedy for the dressings from a discharging wound.

Perhaps you think it is disgusting to read about such things, and so it is. But is it not more disgusting to have these same flies, after their repast of filth, drown in the milk pitcher, drop their specks on the frosted cake, or clean their feet on the bread? Is it pleasant to see the flies that very likely have just come from a neighboring privy crawl over the lips of the sleeping baby, or gather on the nipple of its nursing bottle? Suppose the fly that was fished out of the milk pitcher had just been eating the excrement of a typhoid-fever patient, would you like to drink the milk? Perhaps the flies that were walking on the fruit which you purchased at the street corner had just been feeding on the sputum of a consumptive. Does it not seem likely that flies may spread disease? That is what many physicians and health officers think.

Perhaps hereafter you will screen the house, and protect the food from flies.

The young of flies are maggots. They seem to prefer to breed in stable manure. But they also breed in excre-

ment of all kinds, in garbage, and in all sorts of wet and filthy refuse.

Do you want to raise these filthy insects, these germ carriers, these indicators of untidiness, to be a pest in your own house, and perhaps carry disease to your neighbors? Of course you do not.

Then keep the stable manure closely covered and have it removed often, once a week in summer if possible. Keep the back yard and the alley clean. Allow no refuse to accumulate anywhere. Connect with the sewer if there is one in the street. Fix the privy so it will be fly-proof. After your own premises are in order, talk over the matter with your neighbors, and get them also to read this circular.

DISCUSSION

MR. RITCHIE. There has come to my ears more or less criticism that this circular is not the kind of circular that one would like to print in his daily paper, but the fact is that here are things that should be made known to the public. This circular was the one which in the opinion of our Committee would express certain ideas, put in a form which would attract attention, which would strike the facts home to the individuals, to the members of the boards of health, to the persons to whom the circular might be sent. If the circular is worth having it is worth distributing, and I should be glad to see some action taken whereby if it is worth distributing it may be distributed; and if it is not worth distributing, that the subject matter or the principles of the matter may be so arranged that they can come to the public.

Our Committee, in considering the matter as fully as it could in the time available, has concluded that disease has not yet been fastened sufficiently closely to the fly to make that a watchword in the campaign.

DR. BROUGH. Mr. President, I notice that in the circular they do not mention any method by which we can dispose of the flies. They recommend screening excreta, but is there any special way they recommend in regard to killing them?

MR. RITCHIE. The fly warfare of the future is not to be conducted with sticky fly paper or the fly broom, it is to be conducted by sanitarians on a larger scale at the places where the flies breed. The flies breed in filth. The warfare that is to be carried on at the places where the flies breed is the campaign for cleanliness. It is a warfare similar to the warfare against mosquitoes, a warfare on their breeding places, and if we take it as our watchword that the measure of the cleanliness of a place is its lack of flies we have a watchword upon which we ought to be able as sanitarians to fight.

DR. WHEATLEY. I would like to inquire through you, Mr. President, of the Committee, whether they have ascertained the migratory habits of flies, how large a zone, how large an area of territory flies cover.

MR. RITCHIE. This is one of a great many unanswered questions regarding the fly.

VICE-PRESIDENT DURGIN. When it was proposed that this Committee be appointed it was with a view of unifying thought upon the best methods of preventing the breeding of the fly. It was hoped that such a report would be made as would appeal to the Association and arouse a sense of the importance of earnest, universal action against the fly as a public nuisance. I will call on Dr. Chapin to close the discussion, after which it would be well to consider the question of continuing the Committee.

DR. STEVENS. Before Dr. Chapin speaks I would like to say a word in regard to the question. If this Association approves of this circular and adopts it, and recommends it being published in the papers, the local papers of the small towns and the large towns, it will reach more people than all the circulars you can send out. It is a well-known fact that the community have great faith in what they read in the newspapers, especially anything that relates to their health. If the papers publish this sort of thing everybody will see it and everybody will believe in it. It will have more effect than anything else you can do.

DR. CHAPIN. The Committee are not able to answer the question that Dr. Wheatley asked, and we were not able to answer very many questions which were asked by ourselves. It seems to me that this is a fine opportunity for the boards of health to do good work. Let them study during the coming summer the distribution of flies — the seasonal distribution of flies, the local distribution in the town or city, and their breeding places. You all know the very valuable work that Professor Underwood has done in studying the distribution and growth of the mosquito. Cannot we have work on flies in emulation of his? In regard to this circular we give it to you as a suggestion, and we expect that you will indicate points in which it may be improved. It was not given out as a model, but simply as a suggestive circular.

VICE-PRESIDENT DURGIN. The Chair would for one be very unwilling to see this subject dropped. We have had nothing more important before us for years, and it is worthy of our very earnest, continued attention. The Chair would suggest that some expression of the Association as to the continuance of the Committee, and any addition to its membership would be in order.

As a result of various motions and amendments the Association approved the report of progress and continued the Committee, instructing them to distribute the circular at such time as may seem best to them to the press and to local boards of health throughout the Commonwealth. The Committee was also requested to include the circulars on sex hygiene when mailing. Mr. Underwood was added to the Committee.

REPORT OF COMMITTEE ON MILK LEGISLATION.

The Committee appointed to ascertain the sentiment of the boards of health of the various cities and towns throughout the State in the matter of bringing the appointment and direction of the work of milk inspectors under the jurisdiction of local boards of health at our first meeting decided to send out a circular letter to the various places, together with a list of questions to be answered and returned. Up to the present time we have received replies from fifty-seven places.

To the question asking for an expression of opinion as to the desirability of the proposed change, fifty-one of the fifty-seven answered favorably. Following are some of the replies to this question given verbatim:

"It is as important and applicable to boards of health as any other public health work now performed by them. It properly belongs with the boards of health."

"Unanimously in favor of such change."

"Very desirable and believe very important that change be made."

"In our opinion such change would result in much good."

"Highly desirable."

"Very essential."

"Good thing."

"Unquestionably, the appointment should be made by local boards of health, and the inspection and supervision of

market milk should be in their control, and the licensing of milk dealers."

"Boards of health should have absolute control."

"The board of health earnestly desires such change as we feel it would place the matter where it rightfully belongs."

"It would be the right thing, thereby giving the board of health the control as well as responsibility for pure milk supply."

"We feel that it would be of great help and a benefit to us."

"It is the only proper way."

"It would be eminently proper."

To the question, "Will your board coöperate in the attempt to secure legislation to this effect at the next General Court?" fifty-one replied promising assistance, four were noncommital, and two answered no. Of the two last, one was favorably impressed with the desirability of the change, but for some unstated reason couldn't promise any help. The other replied asking whether "any legislation is necessary in view of Chapter LVI of the Revised Laws, Section 51 of which seems to give the necessary authority." As neither the section nor chapter referred to mentions local boards of health in any way, the Committee feels that in this particular case our correspondent erred in his interpretation of the statutes.

It was found that four cities have already secured special legislation transferring all matters pertaining to milk inspection to the local board of health. All four stated that the change had resulted in increased efficiency.

One city has in its new city charter granted the power of appointment of milk inspector to its board of health, which reports largely increased efficiency in the work as a result.

Three other cities have special ordinances giving the boards of health direction of the work of milk inspectors and report that the change has resulted in increased efficiency.

In one town the board of health appoints the inspector

and directs his work. In one other town he is appointed by the selectmen and board of health jointly. In three other towns the inspector is appointed by the selectmen, but by special arrangement the direction of his work is given over to the board of health.

Two cities report unsuccessful attempts to secure legislation transferring the milk inspector to the board of health.

It is the desire of your Committee to have passed at the next session of the General Court an act amending Section 51 of Chapter LVI of the Revised Laws so as to transfer the appointment of milk inspectors from the mayors and selectmen to the boards of health of the respective cities and towns, excepting such as have already secured like legislation. The Committee is aware that strong opposition may appear from certain places and is at the present time unable to decide whether to try to overcome such opposition or to eliminate it by excepting the places from which it emanates from the provisions of the proposed act. We can, however, by using the influence of all who have signified their intention of assisting, make an effort to have the act apply to as many places as possible, leaving the others to come in whenever the opposition has diminished sufficiently.

The Committee would like to have the indorsement of the Association of the proposed legislation, as we believe that such an expression would be of considerable assistance.

G. E. BOLLING,
Chairman.

DISCUSSION

DR. RUSSELL. A case in which I was interested was brought before a judge of the Supreme Court of the State, and he decided that a milk inspector was simply a clerical officer; he had no judicial functions whatever; all the rights he had in the matter were simply when a man applied for a

license to grant him one, although he might know that the man was absolutely unworthy and was producing at that very time impure milk and selling it. If a board of health was constituted of men interested in scientific questions and interested in health they would appoint a good milk inspector. Unfortunately, if they were not, they might appoint the other one. I am most heartily in favor of the boards of health appointing the inspectors, having had experience on both sides of the question.

DR. HOLDEN. The inspector of milk is not altogether a licensing power, but he acts in a clerical capacity, and he must license every person that applies, regardless of whether he is a fit person to handle milk, and regardless of whether the premises are in a sanitary condition or not. That is the law as it stands today in the opinion of the city solicitor of the city I represent. It is a very important matter and a very vital matter that that should be changed.

MR. GEO. WHITING. It seems to me the milk inspector has a great deal of authority and that he fills a very important office, and there is no more power vested in him than there should be. We are bound to respect his authority, and I must say he has spurred us on to a greater activity in looking after our dairies and our general milk supply. It seems to me the local boards of health are more competent to decide upon the men to act as milk inspectors than any other body or individual. They are certainly in closer touch with the subject than anybody else. I should suppose it would be the sense of this meeting to work toward this end. Our experience with the boards of health is more or less limited. We have not had much to do with any but the Boston and suburban boards, but from our experience I am satisfied that the appointment should be made by the boards of health.

MR. GEORGE H. ELLIS. If the statement is correct that the milk inspector is only a clerk, who when application is made for a license is simply bound to issue it, I don't see that it makes a particle of difference who appoints him, unless if he is appointed by the board of health he is made also the agent of the board of health, and as such agent looks after the source and the handling of the milk. As inspector under the present law he has not a particle of power in either case. When he decides that the law has been complied with as to the total amount of solids and butter fat, doesn't the province of the inspector end? Is it the province of the inspector to consider the health question? Isn't it that side of the question that this Association is considering?

VICE-PRESIDENT DURGIN. I should say that in one instance his authority did end as you state, but not under the board of health. When he is an officer of the board of health he carries out that and other matters which the board of health thinks proper to institute. The board of health aids the inspector by adding and enforcing other work than that of looking after the solids of the milk; for instance, dirty milk is quite as important to look after as the solids.

DR. DAVENPORT. I should like to ask if there has been a recent ruling that the authority of the board of health is simply to register the licenses, and not to prosecute violations of the statute in regard to milk.

VICE-PRESIDENT DURGIN. With us the inspector of milk does prosecute all cases of violation, whether it be upon the old statutory requirements on solids, or whether it be under the regulation of the board of health on the bacterial count, and the temperature, or anything else for which the board of health makes a request.

DR. WORCESTER. From what I have heard here I understand that an inspector of milk appointed by the selectmen, if it happened to be in a town where the selectmen were the board of health, as they are under statutory law unless others are elected, would be inspector and agent of the board of health. In other cases, where there is a board of health and the selectmen have the power of appointing an inspector of milk, he would be simply an inspector of milk, not an agent of the board of health. Where there is a board of health and the inspector of milk is appointed by the board of health, he is also an agent of the board, and in those cases would have power to go beyond merely issuing milk licenses. Is my surmise correct? If that is the case, it seems to me that the appointment of inspectors of milk should come under the board of health. In that way the inspector becomes an agent of the board of health, with full power to prosecute for any delinquency on the part of milkmen and milk producers. I can see no benefit from the selectmen having the power of appointing milk inspectors; I can see every benefit accruing to the public from the board of health having such power.

MR. COFFEY. I am heartily in favor of the recommendation of the Committee, because the city that I represent has just recently taken this step. For a number of years at Worcester we had tried at various times to get control of the milk department, but did not succeed. Two years ago circumstances were such that the city council went to the Legislature, and a special act was passed at the request of the mayor and city council of Worcester, transferring the milk department to the board of health. The old law, as you are all aware, requires the appointment of the inspector by the mayor and confirmation by the board of aldermen. That is productive of quite frequent changes. It is apt to be a political football. It was not so at Worcester always;

some men stayed quite a long time in that office, but frequent changes were made even there, and in some places I understand a change is made almost yearly, or with the change of administration. The milk inspector's duties are defined by the statutes, and they are almost entirely the issuing of licenses and the testing of the milk to find if it is adulterated. By transferring it to the board of health we adopted a series of rules and regulations which gave him increased powers.

But there is one thing that has been alluded to here that is fundamentally wrong, and that is that he must license any one who comes in and makes application and deposits fifty cents. I don't know of any other license that is issued under the authority of the laws of Massachusetts in regard to which the same rule applies. I am a member of the license board of Worcester, in which we license about everything except liquor and marriage. We issue all the licenses that were formerly granted by the board of aldermen of Worcester, and we have the right to refuse a man if we don't consider that he is a proper person to carry on the business. In this matter of milk, a very important matter too, in fact very much more important than lots of those licenses that the licensing board has the right to refuse if it deems the applicant unfit, we have no right, as I understand it, to refuse; we must grant a license to a man who comes in and who may be very filthy in his personal habits and his personal apparel. That man we must grant a license to carry on the milk business if he puts fifty cents on the counter and makes application. The law in that respect ought to be changed. If it is presented to the Legislature it will be changed, because on the face of it its necessity is so apparent that I don't think it needs very much argument to convince any committee of the Legislature of the need of it.

Another thing perhaps might be done. The milk inspector under a general law might be made the agent of the board of health. He should not be an independent or a semi-inde-

pendent person, with certain powers defined by the statute, but he should be an agent of the board, the same as any other man in the employ of the board, empowered to carry out its orders and enforce its rules and regulations. The whole question of milk inspection should be transferred to the board of health, with the right to appoint an inspector of milk just as they appoint a plumbing inspector or a general inspector, and he should have then the powers that the board would give him to enforce the rules or regulations that might be made by them in the interest of pure and clean milk.

If you are going to do anything you must do it before the next meeting of this society, which takes place the last Thursday in January, too late to introduce any new matter in the new Legislature.

MR. BOLLING. In connection with what Mr. Coffey has said, does not a health board at present have power to appoint agents to execute its regulations? If it had the appointing of the milk inspector he would be an agent of the board with power to enforce any special regulations concerning milk that the board might establish.

MR. COFFEY. I move, Mr. Chairman, that the report of the Committee be accepted as a progress report, and that they be instructed by this organization to prepare a bill, after consultation with the executive officers of the State Board of Health, for introduction at the next session of the Legislature.

(The motion was adopted unanimously.)

The paper on "Conveyance of Bacteria by Sewer Air," by Prof. C. E. A. Winslow of the Massachusetts Institute of Technology, is withheld for the present at the request of the National Association of Master Plumbers, for whom the experimental work was done. After presentation to that Association it will appear in full in this Journal. — EDITOR.

COMMUNICATIONS

THE PRESENT MANAGEMENT OF SMALLPOX IN MINNESOTA

(Communicated by request of the A.J.P.H.)

In October, 1906, the following recommendation was adopted by the Minnesota State Board of Health:

> "It having been established that smallpox will not occur in a well-vaccinated community, and that all attempts to restrain this disease in a community not protected by vaccination, by means of quarantine, will fail; that quarantine in a well-vaccinated community is unnecessary; that attempts to control the spread of smallpox by means of quarantine are unscientific, irrational, expensive and misleading; that, in laying down strict rules for the quarantine of smallpox, sanitary authorities are favoring unscientific and illogical methods for its control and are conveying false ideas as to the safety of the public, the Minnesota State Board of Health advises that after Jan. 1, 1908, further attempts to control smallpox by means of quarantine shall be abandoned."

The reason for postponing action on this recommendation until Jan. 1, 1908, was that time might be given those who wished so to do to provide for their own and others' protection through vaccination.

On Aug. 6, 1907, said State Board of Health, following out the above recommendation, formulated the following regulations:

"The local health officer having knowledge of, or having reason to suspect, the existence of smallpox, shall investigate, and at once place upon the house where smallpox exists a sign setting forth the facts. This sign is to serve only as a warning to those who may wish to avoid the house, and not as an indication of quarantine. When the attending physician considers a smallpox patient as having recovered, he shall report the facts in writing to the local health officer, who shall thereupon remove the warning card from the house. The patient must not leave the house until after the removal of the warning card." [Provisions for terminal disinfection and the reporting of cases and deaths follow.]

It so happened that Minnesota was in the midst of an epidemic of a mild type of smallpox when these new regulations went into effect,—a most trying test, for if said new regulations were to prove inefficient the smallpox morbidity should at this time have increased and persisted. A deluge of criticism was poured upon the State Board by those who had not studied the conditions. As a matter of fact, the full-fledged epidemic present before the new regulations went into effect emphasized the inefficiency of the old quarantine regulations. It was not strange that such an outbreak should be continued into 1908, as it was.

The smallpox record in Minnesota for the last five months of 1907 and the first seven months of 1908 is as follows:

1907.	Cases.	1908.	Cases.
August	52	February	1224
September	51	March	1135
October	121	April	1093
November	313	May	909
December	662	June	407
January	936	July	233

From the preceding it will be noted that the number of cases of smallpox did increase during the first four months after the new regulations went into effect, but following this there was a decrease from month to month, as shown in the records of May, June and July. The fact that the morbidity rate diminished under the new regulations would seem to weaken the value placed upon the old quarantine regulations.

The Minneapolis and St. Paul health officials were not favorable to the new regulations. The city council of Duluth ordered the old rigid regulations of the State Board, in force before Jan. 1, 1908, to be continued. The record for these three cities during the period already referred to is as follows:

1907.	Minneapolis.	St. Paul.	Duluth.
August	No report.	5	No report.
September	No report.	5	No report.
October	No report.	66	No report.
November	68	110	19
December	82	65	34
1908.			
January	106	65	96
February	97	45	39
March	94	61	105
April	117	34	114
May	38	32	80
June	20	83	84
July	No report.	38	29

It would thus appear that these cities which were under the same regulations relative to the control of smallpox as those prior to Jan. 1, 1908, made no better showing in mor-

bidity rates than did the State at large which was under the new regulations. It might seem as though the continued high rate of smallpox in these three cities after January 1 was due to imported infections from the country districts, but the records do not support this possibility. It would seem, therefore, that these records indicate the impossibility of controlling smallpox *with quarantine*, even under careful sanitary supervision. As a matter of fact, Duluth permitted prisoners who had been transferred from the jail to the quarantine hospital to escape. Truly, if patients cannot be restrained in a quarantine hospital, how are they to be restrained in private residences?

The health commissioner of Chicago raised the question as to whether Minnesota should not be quarantined against after the new regulations relating to smallpox went into effect. He announced that Chicago did not want smallpox infection from Minnesota. This commissioner was thereupon asked to advise the Minnesota State Board of all smallpox infections reaching Chicago from Minnesota. This he promised to do and reported three such cases prior to Feb. 8, 1908, for that year. Of these three cases one was from St. Paul, one from Duluth and one from the State at large. As both St. Paul and Duluth were under the same regulations at the time these two infections went to Chicago as prior to Jan. 1, 1908, the new regulations of the State Board could not be held responsible for these infections.

One of the Chicago sanitary officials stated in discussion at the American Medical Association meeting in Chicago in June, 1908, that Chicago was receiving smallpox infection from Minnesota, but Minnesota has received no notification of such infection beyond the three cases already referred to, nor do the Chicago records support the statement of this official, as shown as follows:

SOURCES OF SMALLPOX INFECTIONS IN CHICAGO, JAN. 1 TO JULY 25, 1908.*

	Cases.		Cases.
Chicago	47	Texas	1
Illinois (outside of Chicago)	12	Kansas	1
Wisconsin	1	Oklahoma	2
Minnesota	3	California	1
Michigan	1	Tennessee	1
Indiana	4	Washington	1
Iowa	2	Montana	1
Missouri	5		
Total			83

Of the 36 infections from outside of the city of Chicago, one was from a district in Minnesota under the new regulations and 35 were from cities or States presumably still practising rigid quarantine for smallpox. Chicago with its 47 infections is also supposed to be under rigid quarantine supervision. Apparently quarantine neither prevents infection in Chicago nor the importation of smallpox from other sections.

It would seem that the stand taken by Minnesota relative to the control of smallpox has set other sanitary officials thinking. I am advised that one of the western Canadian provinces is considering the question of adopting regulations similar to those of Minnesota. North Dakota is now under such regulations, and another western State is about to consider action even more radical than that taken by Minnesota.

The argument submitted in favor of the action of the latter is in part as follows:

> "I believe there is not a health officer in the United States who is not fully convinced that vaccination will prevent smallpox, and that quarantine at best is only a

*Taken from the Chicago *Weekly Bulletin*.

partial preventive. The people who are opposed to vaccination depend upon quarantine to protect them.

"This quarantine must be maintained at the expense of all the people of the State, in order to protect the few. Is it right that where we have an absolute preventive, obtainable at a nominal cost, the entire people of the State should be put to a heavy expense in order to protect the few?"

And it is, therefore, proposed that "persons suffering from smallpox shall be allowed to go at large as are persons afflicted with a non-communicable disease."

In Minnesota many careful thinkers have expressed their approval of that State's new regulations.

After the protest from Chicago relative to imported cases of smallpox from Minnesota, the State Board of that State felt that it did not wish in any way to be party to the spread of smallpox into other States. It therefore passed the following regulations relative to the unvaccinated:

"Following an exposure to smallpox, every individual who cannot show evidence of a recent successful vaccination or a recent attack of smallpox must be vaccinated within three (3) days of the first exposure or placed under the same isolation restrictions as smallpox patients.

"If smallpox prevails in a community, or if the disease appears in a school, all unvaccinated teachers and pupils must be excluded from school for a period of three weeks unless vaccinated within three (3) days of first exposure. Failing to comply with this requirement, the school must be closed for a period of three weeks.

"If smallpox appears in any class in any college in Minnesota, all unvaccinated teachers and students in the class must be excluded from recitations for a period

of three weeks unless vaccinated within three (3) days of first exposure. Failing to comply with this requirement, the classes attended by such teachers or students must be discontinued for a period of three weeks."

On deliberate consideration of conditions the Minnesota State Board of Health feels that it has made no mistake in its new regulations, unless it is that they are not sufficiently radical.

H. M. BRACKEN.

TRAVELING TUBERCULOSIS EXHIBIT

To the Editor of the American Journal of Public Hygiene:

The Boston Association for the Relief and Control of Tuberculosis has a traveling tuberculosis exhibition, which has already been used in a good many cities of the State by boards of health and other organizations for the education of the people in their cities in regard to the means of prevention and relief of tuberculosis. The exhibition consists of models of window-tents for obtaining fresh cold air in the sleeping-room, without reducing the temperature of the whole room to that out of doors; tents, shacks, sleeping-balconies, effect of dark unventilated rooms on health, and photographs and other illustrative matter in regard to the sanitaria in Massachusetts, and also material in regard to hospitals which have been and are being erected and other means taken in the State of Massachusetts and elsewhere for the relief and control of tuberculosis. I take this opportunity to mention the matter to the chairmen and secretaries of the boards of health in communities where the exhibition has not already been used. If any of them feel that it would be useful in their city or town I would be very

glad if they would communicate with me at 4 Joy Street, and we can make an engagement for use of the exhibition in their city or town from four to eight days, or longer if it seems desirable, at any time after the first of January. The cost of holding an exhibition can be kept, for a period of eight days, well within $150. It is possible to do it for $100, but it does not seem efficient to do it for $100. The third $50 is very much better spent than the first or the second. That simply means that it is the advertising cost which gets the results out of the use of the first $100, which is the fixed charge. I would be very glad to hear from anybody to whom such an engagement seems desirable.

W. E. KRUESI, *Secretary.*

PERSONAL HYGIENE

By PERCY G. STILES, Ph.D.
Instructor in Physiology, Massachusetts Institute of Technology

A BRITISH CRITICISM OF REDUCED DIETS. The advocacy of low feeding (Fletcher, Chittenden, Fisher) has been mainly confined to America. We have previously called attention to the strong counter-movement in this country in which Benedict has been prominent. There has just now appeared a highly interesting and important address by Sir James Crichton-Browne dealing with the subject under the title, "Parsimony in Diet." * No extended review of this article can be undertaken, but certain portions of it call for consideration.

The fact most emphasized by the writer is the obvious one that if the New Haven workers and their enthusiastic disciples at Battle Creek are distinctly in the right, they form a very slender company of elect in an unregenerate world. The people whose diets most nearly approach their standard are those whose poverty denies them what they crave. The protein ration of the very poor is Chittenden's ideal. The quantity of food furnished in British prisons corresponds closely with what he recommends. Prisoners fed according to this scheme deteriorate physically; and we have the testimony of John Burns, based on a voluntary experiment, that the suffering from hunger is cruelly intense.

It is most important to account for the disparity between the experiences of students who grow strong upon minimal

*Journal of the Royal Institute of Public Health, Vol. XVI, No. 8, p. 471, No. 9, p. 527.

feeding and those of prisoners whose health and strength decline with the same quantity of the food-stuffs. Of course in one case the food is attractive and varied, in the other simple and monotonous. But hunger might be expected to insure an economical use of the diet, no matter how coarse and plain. The mental condition of the two classes may have a bearing on their nutrition, but it is hard to see why an intellectual man should need less food than an illiterate of the same weight. It seems to us (and this is on our own responsibility, and not Crichton-Browne's) that the element of difference between the two is that of *previous condition*. The subjects who have been so well and active for considerable periods on Chittenden's diets have been well nourished to start with. The majority of prisoners have not. They have been deficient in reserve stores. Such persons seem to be well adapted to give us indications of the sufficiency or the inadequacy of a given diet. Improvement or injury cannot be long delayed.

Crichton-Browne, like Benedict, concludes that temporary success with a low ration cannot be held to prove its superiority. Nothing less than lifelong health with such feeding, or better still the prosperity of successive generations, can fully justify such a departure from instinctive practice. Our author states that British laborers lose vigor and efficiency at an age of about forty years. For a long time they have been strong and active with no obvious sign of being underfed. When the comparatively early decline sets in, is it not reasonable to suppose that the underlying cause is to be found in a diet which was all the time below the optimum? The ill effects of overeating are long delayed, and it is not strange that the physical results of underfeeding are equally slow to appear. New England farmers certainly consume Atwater rations rather than the Chittenden type, and their capacity for hard work does not decline at forty as a rule.

It must be admitted that it is possible to overestimate the

importance of diet as influencing the health of this or that class of people. We must not leave out of account other factors, such as hours of sleep, ventilation, monotony or variety in life, happiness or discontent. But it seems more and more clear that when these other conditions are unfavorable, liberal feeding can partly offset their effects. Is it likely that the experiments of Chittenden and Fisher would have been so striking if their subjects had been made to endure tenement-house conditions? It is privately admitted that some severe cases of "blues" developed at New Haven. With depressing surroundings this tendency would have been serious.

The question of resistance to infection is one which has to be faced. Crichton-Browne is positive in his belief that the older and more generous dietetic standards make for protection against the lodgment of germs and better the chances in the struggle when disease already exists. In support of this position he cites the practice of rich feeding — sometimes incredible in quantity — prevailing in many successful sanataria. Reference to his paper will reward the student of these timely questions.

VETERINARY HYGIENE

By W. L. BEEBE, D.V.M.
Bacteriologist for the Minnesota State Live Stock Sanitary Board.

THE PRESENCE OF TUBERCLE BACILLI IN THE FECES OF TUBERCULOUS CATTLE. The presence of the tubercle bacilli in the feces of animals that have reacted to the tuberculin test has been demonstrated by several observers. In 1907, Schroeder and Cotton of the United States Department of Agriculture, Bureau of Animal Industry, published a bulletin entitled "The Danger from Tubercle Bacilli in the Environment of Tuberculous Cattle." The cattle used in this experiment were seven animals that had been proven to be tuberculous by the tuberculin test and three non-tuberculous cattle that were given a small amount of culture of tubercle bacilli in their drinking water. One of the tuberculous animals was known to have been affected for several years, another was proven to be affected with generalized tuberculosis by a post-mortem examination after the experiment, and the others were supposedly recent cases.

To sum up the results of the investigation it was found that among seven natural cases of tuberculosis, five, or 71.43 per cent, were passing acid fast bacilli that microscopically resembled tubercle bacilli. The two that failed to show tubercle bacilli were a cow with an affection limited to one post-pharyngeal gland, and a young steer in which the presence of tuberculosis would not have been suspected if a tuberculin test had not been made. The authors in the summary state that "The feces of four of the five cattle were used in inocu-

lation test and were found to be infectious in two cases. To these a third must be added as a subsequent inoculation test hereinafter described will show." The three cows that were given cultures of tubercle bacilli in their drinking water showed the presence of tubercle bacilli in their feces on microscopical examination. The feces were shown to be infectious from one of these cows by guinea-pig inoculation, and by the feeding of the feces of the other two cows to hogs.

The saliva, nasal discharge and urine of two cows and the milk of three other cows were tested for the presence of tubercle bacilli by microscopical examination and guinea-pig inoculation, and the milk also by ingestion experiments. All tests were negative with the exception of the saliva of one cow, which constantly produced tuberculosis in guinea pigs inoculated with it. The presence of tubercle bacilli in the saliva is accounted for by the authors by the fact that this cow coughed a great deal. It must be borne in mind that this might frequently be the case in cattle, as the mouth is usually always open if the animal coughs violently, thus the mucus is expelled into it.

Shortly after the appearance of Schroeder and Cotton's bulletin, Reynolds and Beebe, of the Minnesota Experiment Station, published a bulletin entitled "Dissemination of Tuberculosis by the Manure of Infected Cattle." The material for this work was obtained from forty-three head of cattle that had previously reacted to the tuberculin test. Twenty-two of these were pure bred and grade Shorthorns, Aberdeen, Angus and Hereford cattle, that had been rejected from the University herd on account of their having reacted to the tuberculin test. Some of these animals first reacted several years ago, and had been kept in isolation ever since. The remaining twenty-three animals were pure bred Shorthorns and grades which were kept upon a stock farm under the Bang system. The majority of these animals had first reacted to the tuberculin test about two years previous to the

time this investigation was started. There were a few of these, however, that had reacted six months after the first test and were then stabled with the other tuberculous animals. The authors state that some of these animals from which samples were taken were presumably badly affected, as most of them had been known to be tuberculous for at least two years, and during that time they had been confined in a barn for at least six months of the year. These workers relied almost wholly upon inoculation of guinea pigs and also to some extent upon smear preparations.

The feces were mixed with water and the coarse particles filtered out by passing it through cotton, and varying quantities of the liquid injected subcutaneously into guinea pigs. In all one hundred and fifty-three guinea pigs were inoculated, but only about sixty per cent lived, the others dying from septicæmia, etc. Of the forty-eight animals they had under experiment the feces of sixteen of them were tested three times, one cow five times and two cows four times. The feces of fourteen animals were tested for tubercle bacilli twice and of seven animals were tested for tubercle bacilli only once. Of the entire lot they were able to but four times demonstrate tubercle bacilli in the feces by animal inoculation, and all these being from one animal and at no time were they able to demonstrate their presence in smear preparations. The post-mortem notes of this animal show that the cow was badly affected with generalized tubercu losis, but no intestinal ulcers were found.

In July, 1907, Schroeder published another bulletin entitled "The Unsuspected but Dangerously Tuberculous Cow." In this bulletin the author reprints the examination of the feces of thirty head of cattle, twenty-four of which were removed from dairies and six others which were known to have been tuberculous for three years or more. Among the former ten, or a trifle over forty per cent, were found to be expelling tubercle bacilli, and among the latter all were

expelling them. The cows removed from dairy herds had the general appearance of ordinary dairy cows. Even those that were expelling tubercle bacilli appeared to be and acted as well as those that were not expelling them. Butter made from one of these animals contained virulent tubercle bacilli after forty-nine days, as was proven by guinea-pig inoculation.

At the recent International Congress on Tuberculosis, Schroeder read a paper entitled "The Occurrence and Significance of Tubercle Bacilli in the Feces of Cattle." In this communication attention is called to the fact that the percentage that expel tubercle per rectum is found to double in about eighteen months, and the frequency with which tubercle bacilli can be detected in the feces of individual animals and the number of bacilli relative to the mass of feces passed also increases.

It will be seen that the results of Schroeder and Cotton's and Reynolds and Beebe's work is quite different. It is quite generally believed that the bacilli are discharged with the feces only when open tuberculosis exists in the respiratory organs or the digestive tract. Probably there is more danger in cattle from the respiratory than from the digestive tract, as intestinal ulcers are very seldom encountered in cattle. There is a possibility that the widely different results were due to the fact that the percentage of cattle affected with open tuberculosis in the herds examined by Reynolds and Beebe were very small. Post-mortem data on tuberculous cattle seem to show that forty per cent is a very high estimate for animals affected with open tuberculosis in the average herd. Perhaps the cattle that Schroeder examined were more badly affected with tuberculosis than the average herd, or it might be true that cattle can be expelling bacilli with the feces when the lesions are apparently closed, as is the case with milk. It has been proven by Bang, Ernst, Theobold, Smith and others that tubercle bacilli are present in the milk even when there are no apparent lesions in the udder.

The experiments of Reynolds and Beebe were apparently carefully conducted. They in all cases removed all the coarse particles from the feces which would have a tendency to produce irritation and sloughing at the point of inoculation, and it is quite evident that a large enough dose of the fluid was given to produce tuberculosis, even if the bacilli were present only in small numbers.

This is a subject of immense importance to the sanitarian and the farmer, even if only a few of the cattle are discharging tubercle bacilli with the feces, as it has been shown that much of the milk sold in cities contains feces in the milk sediments. In the West it is a common practice to allow the hogs to run behind the cows and pick the corn out of the feces.

As this is a subject of such immense importance it seems desirable that more work be done along this line.

MUNICIPAL SANITATION

By CHARLES V. CHAPIN, M.D.
Superintendent of Health, Providence, R.I.

EYE CLINIC FOR SCHOOL CHILDREN. In a letter to the Editor of this journal, Dr. Neff states that Philadelphia has recently established such a clinic. During the first three months following the opening of the clinic, 1,267 cases were treated, or at least examined. Three hundred dollars was set aside to furnish glasses to children too poor to buy them, and 345 glasses were so furnished. Dr. Neff reports great mental progress in many of the children, as indeed has been noticed wherever the eyes of school children have been examined and treated. The claim is made that Philadelphia is the first city to establish such a clinic, but there has been one in Providence for two years, and, if I am not mistaken, several other cities.

BABIES' DISPENSARY. The conviction is growing that in order to preserve infant life something more must be done than to distribute clean milk. Good milk for bottle-fed babies is a necessity, but the education of mothers in the care of children will do more than all else to reduce infant mortality. Hence the "Voluntary Visitors" of the English, the "Consultation de Nourrisson" of Paris, and the "Babies' Dispensaries" of this country. In the United States the trained nurse seems to be the most efficient agency in this particular phase of preventive medicine. One of the best plans for bringing the physician, the nurse, the milk station and the mother into successful coöperation is the Babies

Dispensary of which Cleveland furnishes an example, which is described by Gerstenberger in the *Archives of Pediatrics*, April, 1908, page 561.

CONTROL OF MEASLES IN BIRMINGHAM.* When the first case of measles appears in a school a circular is sent to the parents of all the children in the school, describing the symptoms of the disease, and asking them to keep their children at home on the appearance of the first symptoms. This plan was tried in four schools, with 1,213 children. During the period covered by the experiment seventy-four cases of measles occurred in these schools. In four other schools, during the same period, there were seventy-six cases.

*Report of the Medical Officer of Health, 1907, page 23.

SANITARY ENGINEERING NOTES

By ROBERT SPURR WESTON
Assoc. M. Am. Soc. C.E.

BAMFORD FILTERS OF THE DEWENT VALLEY WATER BOARD.* A detailed description with drawings of the filters after the Puech system to be built at Bamford, England. This system, capacity 12,000,000 gallons per day, consists of two-thirds acres of roughing filters, four and one-third acres of sand filters, a four and a half million gallon clear water reservoir and the necessary adjuncts. The water is passed first through the gravel roughing filters to remove a large part of the suspended impurities. This makes it possible to use a fine sand filter for a much longer time between scrapings and so produces a better effluent at a higher rate than would be possible if the water were passed directly to the sand filters. Each set of roughing filters consists of three compartments in series, each containing finer gravel than the preceding. When clogged, these filters are washed by digging a trench to the iron plate which supports the gravel, and then playing a strong stream of water on the exposed surface, working the trench from one side of the bed to the other until the whole has been treated. The waste wash water passes away through the plate and under-drains. This system is the invention of M. Armad Puech, who claimed that it economized the expense of construction, material, maintenance and space. The bottoms of the sand filters are to be made of concrete covered with

* A. Williamson, A.M.I.C.E., Eng., 86, 100–3, July 24.

a layer of asphalt upon which the filter, consisting of sand supported upon graded gravel, is built. The article and illustrations show the details of construction very fully.

DEMANGANIZATION OF WATER BY MEANS OF ALUMINUM SILICATES (*Reinigung des Trinkwassers von Mangan durch Aluminatsilikate*).* The author gives history of the experiments with artificial zeolite specially recommended by Gans for the removal of Mn from the Breslau water. It is sold under the name of "Permitit," and has the following composition:

Loss on ignition	8.95%
SiO_2	49.60%
Al_2O_3	21.50%
CaO	9.75%
MgO	Trace
Fe_2O_3	.50%
Mn_3O_4	.09%
Undetermined	9.61%

Permitit is not alkali free, and a part of its constituents are soluble in water, especially in water containing CO_2. Hard, ferruginous water containing manganese and filtered through Permitit contains less Al, Fe, Mn and Si oxides and more CaO than before filtration. After a while the Permitit becomes saturated with Mn, but can be regenerated by treating with chlorides of Na or Ca. Results of careful tests to determine the optimum procedures for the regeneration of the chemical are given. CO_2 decomposes the silicate. After regeneration the Permitit again removes the Mn from the water. The absorption of Mn by the chemical is inversely

* Contribution from the Hamburg Hygienic Institute, Prof. Dr. Dunbar, Director H. Noll. Gesund. Ing., Aug. 22, 1908.

proportional to the alkali dissolved by the water. Before the experiments the Permitit contained 0.31 per cent Mn. After using, it had taken up 2.25 per cent Mn. Author does not believe that its solubility, especially in CO_2 water, would prevent its technical use. Every water must be tested before Permitit can be recommended, because it is more soluble in some waters than in others. Mn held in solution by CO_2 (bicarbonate) is most readily removed. Ferrous but not ferric salts are absorbed. A filter six inches thick, operating at a rate of 10.7 million gallons per acre per diem, will purify successfully a water containing 0.1 part per million Mn_3O_4 for 140 days, while a filter operating with a water containing one part per million will last only 14 days between regenerations. The cost of chemical alone, exclusive of tanks, pumping, piping, reserve area and regeneration, is about $15.50 a million gallons. For cleaning, concentrated salt solutions are to be preferred to dilute, and washing should be continued until only a few parts per million of manganese remain in the wash water.

TEN YEARS' STUDY OF CUPAR WATER SUPPLY WITH SPECIAL REFERENCE TO THE GERM CONTENT THEREOF.* A brief description of the Cupar water supply and account of experiments upon the removal of germs from it by sand filtration, including table of bacteriological examinations covering ten years. The filter beds are made up of washed quarry chips at the bottom covered by two feet of graded washed gravel of five degrees of fineness. Every six weeks, as the filter begins to clog, the top is scraped off, washed and replaced; after which the bed must rest at least a week before it regains its filtering efficiency. Bacteriological examinations were made above the filter, just below, and at the city taps and showed that (1) this method of sand filter when in working order removes

*C. E. Douglas (Medical officer of health), Cupar Fife, Edinb. Med. J., 23, 42–53, Jan.

over 90 per cent of the organisms from water containing from 900 to 1,000 per c.c.; (2) the natural range of alkalinity has no effect upon the germ content; (3) the germ content is distinctly greater at the point of delivery than as issuing from filter bed, probably, as experiment showed, because of the state of comparative rest in the pipes; (4) in an upland surface water the number of organisms which grow at blood temperature is a very small proportion of those grown at room temperature. Incidentally it is noted that water in a catchment area may differ chemically from that of the underlying geological formation. The Glenfield scraping process for removing incrustations from pipes is described and recommended.

ICE AND ITS NATURAL HISTORY.* Report of a lecture before the Royal Institution. The author explains the cause of the impurity of melted sea ice. His experiments have shown that sea ice and also glacier ice is a conglomerate made up of pure ice and frozen salt solutions of varying composition, according to the temperature of freezing. Upon raising the temperature the more concentrated solid solutions become liquid first at temperatures below 0°, yielding bitter water because magnesium salts freeze at very low temperatures. These conclusions check with Petterssen's value for the latent heat of sea-water ice, 50, and are further confirmed by photographs made by the author.

DEFECTIVE SPECIFICATIONS FOR SEWAGE DISPOSAL PLANTS.† The Editor notes that the Quartermaster's Department, not the Corps of Engineers of the United States Army, is responsible for defective specifications for sewage disposal works at army posts noted in Eng. News, 59, 533.

* Buchanan, J. Y., Eng., 85, 688 (May 22).
† Ed. Eng., 59, 613.

CORROSION OF STEEL WATER-SUPPLY CONDUIT AT ROCHESTER, N.Y.* Two water-supply conduits lead from Hemlock Lake to Rochester. The older, of wrought iron coated with a mixture of Trinidad asphalt and coal-tar pitch, has corroded but little. The newer conduit installed in 1895, fourteen years after the older, was built of soft, open-hearth steel plates containing not over 0.6 per cent Mn and 0.06 per cent P. It was coated with three kinds of coatings, namely, California asphalt, asphalt and pitch, and baked japan. The baked japan coating appeared to be the best when the pipe was in the trench. Since 1900 rust leaks have appeared on the outside of the pipe to a considerable extent. Damage results when three conditions co-exist, namely, ineffectual coatings, normally wet soil and steel of heterogeneous structure. Corrosion was caused by electrolysis and was confined to places where excessive moisture was uniformly present. Electric corrosion is most marked where the current is concentrated on small areas. No permanently effective coating has been discovered. Corrosion could be prevented by drainage and by avoiding the maximum water level. Cast iron is most durable of all of the irons used for pipe, and wrought iron is much better than mild steel. Experience at other places bears out that at Rochester. In the article the details are described carefully.

SMOKE ABATEMENT IN CHICAGO.† A movement has been inaugurated in Chicago on an educational and economic basis by the Illinois Coal Operators Association, the Chicago Smoke Abatement Association, the Western Society of Civil Engineers and the City Smoke Inspection Bureau, to improve the atmospheric conditions in the city. This is superior to notification and fines, the methods usually employed to reduce the nuisance. Experiments at the

* R. H. Gaines, Eng. News, 59, 578.
† Eng. News, 59, 669, June 18.

University of Illinois show that Illinois bituminous coals can be burned without smoke in properly designed furnaces with careful firing.

STATE CONTROL OF SEWAGE DISPOSAL WORKS.* The Editor notes the differences between English and American conditions, especially regarding the density of population, flow of the streams and the strength of sewage. A review of the progress in State control is given. The time has not yet come to prohibit the discharge of all crude sewage into streams. A discussion of the various views of what constitutes satisfactory sewage disposal in the case of both old and new plants follows. Each individual case should be judged on its merits. In most States control stops with passing on the plans, but recently in Ohio the State Board of Health has been given supervising control, not only over the construction, but the operation of sewage disposal works, — a most excellent example to other States.

PUECH ROUGHING FILTERS OF THE DERWENT VALLEY WATER BOARD, ENG.† A description of the Puech system of preliminary treatment of water previous to filtration. This consists of four roughing filters, one filled with coarse, one with medium and two with fine gravel through which the water flows in turn at rates varying from 110 to 30 million gallons per acre per day. The filters contain a two-foot layer of sand operated at a rate of 3.87 million gallons per acre per day. The gravel filters are washed *in situ*, the material being coarse enough to permit this method of cleaning. The only other plant in England is a small one at the East London Water Works. This gives satisfactory results. At least twelve plants are in operation on the Continent.

* Ed., Eng. News, 60, 179, August 13.
† Williamson, Eng. News, 60, 236, August 27.

LABORATORY TESTS OF EFFECT OF STORAGE ON VITALITY OF TYPHOID BACILLUS IN LONDON WATER SUPPLY.* These tests by Dr. Houston, Director of Water Examination, were published in a report to the Metropolitan Water Board of London, and show what other experimenters have reported, namely, that if storage be sufficiently long the water will be free from typhoid germs. Dr. Houston strongly advocates long storage as a preliminary to filtration. He even prefers a rapidly filtered, well-stored water to a slightly filtered, unstored water, and believes that mechanical filters might be used, provided the water was subjected to long storage before filtration. Tests show that the typhoid germs disappeared from water (100 c.c. test samples) within nine weeks. The author condemns the use of raw, unstored water for filtration purposes, and recommends tentatively a four weeks' period of storage as affording a sufficient margin of safety.

ELIMINATING TYPHOID GERMS FROM WATER.† The tentative suggestion of Dr. Houston of London to eliminate practically all typhoid germs from water by a four weeks' period of storage is disapproved for American practice where the per capita consumption of water is high, because the heavy capital charges for land and construction necessary for the storage of water would far exceed the combined capital and operating charges for satisfactory filtration.

OZONE TREATMENT OF CROTON WATER.‡ A letter regarding the experiments with the Blanken ozonizer at New York in 1907, written by the City Engineer of Bankok, Siam, and replied to by Mr. de Varona, who directed the experiments. Mr. de la Mahotiere believes that the apparatus

* A. C. Houston, Eng. News, 60, 247, September, 1908.
† Ed., Eng. News, 60, 257, September, 1908.
‡ L. R. de la Mahotiere and I. M. de Varona, Eng. News, 60, 309.

failed because of insufficient contact between water and ozone, and destruction of the gas through compression, the latter due to forcing the air through a very deep tank containing the water. He also believes that the concentration of ozone,—about 1 mg. per liter,—was too low, and that drying the air by refrigeration introduced more complications than the use of lime or calcium chloride. He cites the good results obtained at Cosne (Fr.), where the previously filtered water is ozonized in a gravel tower in which water and ozonized air stream in opposite directions. The concentration is from 6 to 6.5 mg. per liter. Before filtration the water contains an average of 4,000 bacteria per c.c.; after filtration, one.

In reply Mr. de Varona disclaims any responsibility for the design or operation of the plant. It was installed and operated by the owners, who assured the Department of Water Supply of New York that it would produce 85 g. of ozone per Kw. hr., and would operate in a reliable manner. He believes that the exposure of water to ozone in a tower and the drying of the air by chemicals would be impracticable for the treatment of large volumes of water. When the Blanken system operated regularly and properly, the results were excellent. The greatest objection was the prohibitive cost of the process.

INSPECTION OF DOMESTIC WELLS.* This is a report of chemical work in the laboratory which includes analyses of many samples of water from both surface and ground-water sources. The report also contains a *résumé* of the methods employed, which methods do not differ materially from those in common use in England and America.

* Lab. of Internal Revenue Dept., Ottawa, Canada, Bull. No. 149.

VITAL STATISTICS

By MARSHALL LANGTON PRICE, M.D.
Secretary State Board of Health, Baltimore, Md.

THE TRUE POPULATION OF AMERICAN CITIES. Mr. C. Mayo of Milwaukee, in several letters, disputes the estimated population and the census population of the bulk of our American cities.* Mr. Mayo holds that the census population is too high, mainly on account of transients and the manner of taking the census at so much per head (which method is admittedly bad), and that the estimated figures of population are often derived from city directories, which are notoriously incorrect. The proof of these contentions he derives from inquiry and a mathematical *reductio ad absurdum*. As far as directory estimates are concerned, Mr. Mayo cites the inquiry conducted by Mr. Watterson, of the *Louisville Courier-Journal*, in 1907, who found that the real population was to the directory population as one is to one and one-third; that is, for four names in the directory only three real persons lived in the city, the remainder were either dead or transients. A plan similar to Mr. Watterson's was tried by Mr. Mayo in Chicago, on his own responsibility. Mr. Mayo sent out one hundred letters addressed to one hundred short English names with reply postals included. Only twenty-one replies were received, and sixty came back from the Dead Letter Office, "not found." This is probably an extreme case, but serves to illustrate the unreliability of estimates founded on the city directories. As regards the

* Letters C. Mayo to M. L. Price, 1908.

mathematical method of proof, Mr. Mayo points out that the figures fail to tally in any way with the estimated population of one city which he takes as an example (Chicago). Thus Mr. Mayo points out that if the true population of Chicago were 2,170,000 as claimed for 1908, the figures for deaths, voters, births and school children should be, deaths (maximum and minimum), 50,000 to 42,000; voters, 650,000 to 600,000; births, 70,000 to 50,000; school children, 500,000 to 470,000. The actual records in these cases, however, showed that there were recorded in 1908, deaths, 24,000; voters, 390,000; births, 27,000; school children, 320,000. Mr. Mayo estimates the population of Chicago on the basis of deaths and voters at 1,200,000 for each, and on the basis of school children at 1,400,000, while on the basis of recorded births he estimates the population at only 1,000,000. While Mr. Mayo's figures are undoubtedly too high for all of these factors, in American cities where the enforcement of the laws is notoriously lax (and this applies even to his minimum figures), still it is fair to infer from an examination of his figures that the true population of Chicago does not exceed 1,800,000. So far Mr. Mayo's mathematical logic is correct and clear. He applies, however, the law known as Arym's law to the returned figures of death rate and average age at death.

ARYM'S LAW. Arym claimed that there was a fairly constant mathematical relation between the annual number of deaths, the average age at death, and the population. This he applied by the following formula: Annual deaths $\times$ average age at death = population (exclusive of last year's births). Undoubtedly this formula in a rough way corresponds with actual figures, but considering the fluctuation in population, the variation in the number of deaths annually, and in the average age at death, the formula could not be safely applied even in the way Mr. Mayo suggests (to con-

firm the figures of population and death rates), at any rate in our American cities where the distribution of population by ages varies so much from the normal of the older cities.

AVERAGE AGE AT DEATH. The uncertainty of calculations based upon the average age at death is shown by the vital statistics of Maryland. In this State the actual age at death is returned for each death record by means of one of the standard adding machines. These are entered with three decimals, so the maximum possible error would be somewhere in the third decimal. These returns are made by month and by counties. Not only is there a marked variation in the average age at death by months as would naturally be expected (29.925 in July and 40.437 in February), but the average age at death by counties varies from 28.509 to 43.752. If Arym's law is true now, it was not true three centuries ago when the average age at death was in the neighborhood of fifteen years, and it will not be true in the future, when we can confidently expect the average age at death to be very greatly raised, while the annual number of deaths will remain fairly constant.

THE VALUE OF HUMAN LIFE. Numerous attempts have been made to estimate the value of a human life. The main difficulty of the problem lies in the extreme complexity of the relations of the individual to his family, to his community and to the State. Most difficult of all is to give a money valuation to the value of the life to the person who loses it. Certainly it is too narrow a view to take that the value of an individual's life to the State can be measured in money merely by *per capita* taxation. The problem is still further complicated by the fact that for unskilled laborers at advanced ages whose work requires severe muscular labor the period of production is over, and with it the economical usefulness of the individual. On the other

hand, in the sedentary occupations requiring only mental labor, the productive period may extend to an advanced age. Naturally it is necessary to establish some standard or unit from which comparisons can be made. Considering all these points it seems best to adopt what may be called the "life capital method" for the usual method of calculation, and to adopt the "life capital" as the standard unit of calculation. In this method we calculate the capital accumulated during the life of the individual from the beginning of his working period up to the time of his death. If we then assume his annual income to remain constant up to the end of the normal working period, the amount which he would have accumulated represents the potential loss in life capital. In order to make an estimate of potential loss we must, in the absence of definite data, agree upon the duration of the working period. It is perhaps fair to fix the beginning of this period at the twentieth year, and the end at the sixty-fifth year. Certainly the average period of manual labor is practically over at sixty-five. To cite an example: An individual who makes an annual income of three hundred dollars begins work at the age of twenty and dies at the age of thirty-five. During this time he has earned a capital of $4,500, while if he had worked during his full working period, and his earning period had not been interrupted by death, he would have earned a capital of $15,000. There will have been a potential loss in this case of $10,000, shared by the individual, his family and the community. As far as the individual is concerned we may speak of him as having lived a $4,500 life in this case, where he should have lived a $15,000 life. Such calculations are most interesting when applied to specific diseases. In this class of calculations we have what may be called the actual cost of the disease, which includes not only the loss of income from disability during life, but another item which is often surprisingly large, even in persons of small income, namely, the expenditure for drugs,

nursing, physicians' bills and traveling expenses. The expenditures under the last items are particularly large in the case of tuberculosis. In Maryland investigations were made and fairly accurate figures obtained in a number of actual cases, presumably below the average income of wage-earners. The results of this calculation were as follows: the average total money loss incurred by 258 males (wage-earners) was $15,264.85, and the average loss incurred by 70 wage-earning females was $9,140.06. The number of deaths from tuberculosis at that time was 2,669. About 2,000 of these deaths, in round numbers, occurred at the wage-earning ages. If these deaths were equally divided among males and females the loss from the death of wage-earning males would be $15,264,850, and the loss from the death of wage-earning females would be $9,140,060, giving a total of $24,404,810.

UNIFORM RETURN OF VITAL STATISTICS. The best of our American statisticians are working faithfully to secure uniformity in the return of vital statistics. Dr. Cressy L. Wilbur has worked especially hard to have uniform rules of statistical procedure adopted by the Vital Statistics section of the American Public Health Association, and the American Medical Association and other influential bodies interested in the use of figures.

In the past vital statistics have been compiled according to the whim of the registrar, and such compilations have frequently been clumsy and indefinite, and always comparable with difficulty with the vital statistics of any other registrar. Most persons who have made studies of special statistical subjects can recall the exasperation which they have felt to find, after endeavoring to make a compilation of deaths from certain causes by five-year periods, that some registrars had dropped their five-year periods abruptly after the twentieth year and made their returns thereafter by ten-year periods. The "Rules of Statistical Procedure"

provide for the return of deaths by years up to the fifth year, and their return thereafter by uniform quinquennial periods. The Conference of State and Provincial Boards of Health has taken a step in advance to this plan by appointing a special committee of three to secure uniformity in the returns of vital statistics. The work of this committee will include not only the uniform return of ages, but also uniform forms for tables and the graphic representation of statistical facts. Particular attention will be given by the committee to the return of the principal causes of death, both in tabular and graphic form. The committee will probably recommend "approved" and "alternative" forms.

A STATISTICAL STUDY OF INFANT MORTALITY. Edward Bunnell Phelps has contributed an interesting study in the last quarterly publication of the American Statistical Association.* The paper is perhaps the more interesting from the fact that the author does not attempt to draw dogmatic conclusions. The purpose of the article is to compile the available information concerning infant mortality in convenient form for study and comparison. The author denies that any actual concerted effort has been made to reduce the infant mortality previous to the twentieth century. The general trend of the paper is expressed in the quotation from Dr. George Reid, Medical Officer to the Staffordshire County Council: "Although a steady decline has taken place in the general mortality, coincident with, and no doubt in the main consequent upon, sanitary progress, it cannot be said that the infant mortality has diminished in like proportion."

The statistical results cannot be said on the whole to be very encouraging. The results in Massachusetts are characteristic of the whole study. During the twenty-five-year period 1856–1880 the death rate per thousand births under

* Volume XI, September, 1908.

one year was 150.1, and in the period 1881–1905, 153.7. Naturally the statistical findings are very much influenced by the lamentable inaccuracy of birth records everywhere, but the results in Massachusetts and in European countries, where the birth returns are approximately correct, would seem to indicate either that sanitary administrations have failed to grasp the importance of infant mortality or that the present imperfect methods do not adequately control the situation.

VITAL STATISTICS AND THE DOCTRINE OF PROBABILITIES. Statistical conclusions are frequently drawn without due consideration to the doctrine of probabilities. Fallacies in connection with probabilities are particularly common. The crudest of these fallacies, as far as they concern vital statistics, is the return of mortality or morbidity by occupation, without reference to the number of persons engaged in each specified occupation. Thus it is very commonly announced that "tuberculosis is most common in housewives," merely because this is the largest class of returned occupations. The question of domiciliary infections in tuberculosis should be carefully reviewed from the standpoint of probabilities. Thus if, of fifty thousand houses, five hundred are infected with tuberculosis, what, according to probabilities, will be the number of houses which will contain two cases of tuberculosis, or three cases, four cases, etc., independent of infection? There seems no doubt whatever of the frequency of house infection, but none of the American figures offer satisfactory proof of this upon a mathematical basis. The importance of such accurate and systematic investigations will be understood from the recent attempt of one investigator to revive the hereditary theory of tuberculosis on the ground that tuberculosis is seldom communicated from husband to wife and *vice versa*. The extreme ease with which fallacies may arise should make us

very cautious in accepting statements of this kind. The disease itself diminishes the probabilities of marriage. During the marriage period the disease is prone to take a rapid course, especially in women, and the opportunities for the prolonged and intimate exposure necessary to cause tuberculous inoculation are generally lacking. It is quite in accord with these views that we find tuberculosis more frequently communicated from husband to wife than from wife to husband, and that we find tuberculosis communicated to children much more frequently through the mother than through the father. All these facts are easily explainable on the doctrine of relative exposure. We must deplore the misuse of statistics to revive discredited theories on insufficient or untenable grounds, especially when such efforts do material damage in overshadowing the dangers of direct infection.

STATISTICAL FALLACIES. One of the most common of the statistical fallacies arises from the failure to consider the problem of age in its relation to mortality and morbidity. The well-known studies of Reinke tended to show that the death rate from tuberculosis was diminished, and the duration of the disease increased, with the increase of income, within certain limits. While Reinke's main conclusions were undoubtedly correct, his figures need revision, as he took no account of the factor of age in his calculations. As is well known, income increases proportionately with age. Tuberculosis, on the other hand, diminishes in severity and frequence as age increases, and a large part of the favorable influence which Reinke ascribed to increased income was doubtless really due to increased age.

PUBLIC HEALTH LEGISLATION, NEWS AND NOTES

By F. H. SLACK, M.D.
Director, Boston Board of Health Laboratory

THE AMERICAN PUBLIC HEALTH ASSOCIATION held a most successful meeting in Winnipeg, Manitoba, August 25–28. It is an evidence of the amazing growth of the Canadian provinces that Winnipeg could successfully bid for the presence of this convention of the leading health association of America, and there is no question but that the gathering together of these public health specialists, the excellent program presented, and the opportunity given for the local men to get in touch with leading experts will give a great impetus to public health legislation in Canada and many times repay them for their generous and whole-souled hospitality.

Dr. Gardner T. Swarts of Providence, R.I., was elected President of the Association for the coming year. The other officers are, Dr. R. M. Simpson of Winnipeg, Manitoba, First Vice-President; Dr. Jesu Chico of Guanajuato City, Mexico, Second Vice-President; Major Chas. F. Mason, M.D., of Washington, D.C., Third Vice-President; Dr. Charles O. Probst of Columbus, Ohio, Secretary; and Dr. Frank W. Wright of New Haven, Conn., Treasurer.

The Laboratory Section officers are, Chairman, Dr. J. J. Kinyoun of Washington, D.C.; Vice-Chairman, Dr. Wm. R. Stokes of Baltimore, Md.; Secretary, B. R. Rickards, S.B., of Columbus, Ohio; Recorder, Dr. H. D. Pease of Albany, N.Y.

The officers of the Municipal Health Officers Section are, Chairman, Dr. W. C. Woodward of Washington, D.C.; Vice-

Chairman, Dr. A. J. Douglas, Winnipeg, Manitoba; Secretary, Dr. E. C. Levy of Richmond, Va.; and Recorder, Dr. C. V. Chapin of Providence, R.I.

The Section on Vital Statistics elected as Chairman, Dr. Chas. A. Hodgetts, Toronto; Vice-Chairman, Dr. Wm. H. Guilfoy of New York; and Secretary, Dr. W. R. Batt of Harrisburg, Pa.

The next meeting of the Association will be held in Richmond, Va., October, 1909.

NEW CHIEF FOR OHIO STATE LABORATORIES. Burt Ransom Rickards, S.B., Director of the Boston Board of Health Laboratory, has resigned his position to accept one as Chief of the Ohio State Board of Health Laboratories.

Mr. Rickards was born in Cambridge, Mass., in 1876, and is a graduate of the Massachusetts Institute of Technology, Department of Chemistry, 1899, with the degree Bachelor of Science.

He was Instructor in Analytical Chemistry at Lowell, Mass., in the Textile School, 1899, 1900. From 1900 to 1905 he held the position of First Assistant Bacteriologist in the Laboratory of the Boston Board of Health, and has been Director of the same from 1905 to date.

He is Secretary of the Laboratory Section of the American Public Health Association, Managing Editor of the AMERICAN JOURNAL OF PUBLIC HYGIENE, and Lecturer and Instructor in Public Health Laboratory work for the Massachusetts Institute of Technology. He is the author of many papers covering research work on various bacteriological and chemical problems.

BOSTON BOARD OF HEALTH LABORATORY. By promotion, Dr. Francis H. Slack becomes Director of the Boston Laboratory, and Dr. Burdett L. Arms, Assistant Director.

Miss E. Marion Wade has been appointed to the position of Bacteriologist, left vacant by Dr. Arms. Miss Wade is an honor graduate in Arts in the Department of Physical and Natural Science of Trinity University, Toronto, Ont., 1904. She has had special training in Bacteriology at the Summer Course of the Harvard Medical School, also special courses in Air Analysis and Water and Sewage Analysis at the Massachusetts Institute of Technology. For four months in 1907 she served as a volunteer assistant in the Boston Board of Health Laboratory, becoming thoroughly proficient in diagnostic work. She has since served as assistant to Mrs. Ellen H. Richards, Instructor in Sanitary Chemistry at the Massachusetts Institute of Technology, and as Analytical Chemist in the Research Laboratory of the General Electric Co., Schenectady, N.Y.

THE NORTH CAROLINA STATE BOARD OF HEALTH has secured the services of Mr. J. Wilfred Kellogg as Assistant Bacteriologist. Mr. Kellogg has had charge of the Filtration Plant at Washington, D.C. He comes to his new duties with a thorough training along bacteriological lines.

SAVANNAH, GA., makes announcement of the opening of the new bacteriological laboratory under the charge of Dr. Victor Bassett.

IOWA PASTEUR INSTITUTE.* A State Pasteur Institute has been established at Iowa City under the direction of Dr. Henry Albert, State Bacteriologist.

* Journal A. M. A., Nov. 21, 1908.

BOOK REVIEWS

The Prevention of Tuberculosis. By ARTHUR NEWSHOLME, M.D., F.R.C.P. *Methuen & Co., London,* 1908. *Price, Seven Shillings.*

This work is written from the standpoint of the health officer. Every phase of the subject which is of interest to sanitary official is discussed with great clearness. One chapter deals with the trustworthiness of statistics, and the author shows that in England, at least, the decline in the death rate from phthisis is real and cannot be explained by transference to other diseases. The infectivity of the disease and the sources and portals of infection are as fully discussed as the limits of the work permit. The author believes that we are not as yet in a position to determine with any degree of accuracy the relative importance of the different sources and modes of infection. After reviewing the evidence he concludes that it is not unfair to assume "that from five to ten per cent of the total human mortality is due to infection from bovine sources." Assuming the remainder to come from human sources, he says that "tuberculosis is undoubtedly caused most often by domestic infection," and that "the intimate relationships of domestic life are much more likely than casual extra-domestic infection to be the chief means of spreading tuberculosis." But it is the person rather than the house that is chiefly dangerous, for he says: "Although it is in the highest degree desirable that such a house (where a consumptive has lived) should be efficiently cleansed and disinfected, it is unlikely to form a large element in the production of phthisis by domestic infection."

Part II of the work considers the means by which the decrease in tuberculosis is secured. Newsholme's well-known view is, that an important, if not the chief factor in the decline of tuberculosis is the increasing segregation of advanced cases in institutions, chiefly almshouses. Certainly the great array of figures which he presents indicates that such may well be the fact in the European countries from which the figures are drawn. The early recognition of cases is a prime necessity, and the responsibility of physicians is duly emphasized. A better organization of free medical service is urged in order to secure an earlier recognition of cases. Registration is essential, but is useless unless each case is followed. Every patient must be studied, taught, helped and encouraged. Hospital treatment should be furnished by the municipality, and the excellent work done by Newsholme at the contagious disease hospital in Brighton is an example for other cities to follow.

The price of this work renders it possible for every health officer to possess a copy, and he will find it a most useful handbook.

CHARLES V. CHAPIN.

The Hygiene of Medical Cases, Particularly in Hospital Wards. By DAVID L. EDSALL, M.D., *American Journal of the Medical Sciences, April*, 1908.

This quite unusual (as coming from a physician), but very important contribution to the crying need for medical, as distinguished from surgical asepsis, *in hospitals*, with excellent illustrative cases, should be read by all public hygienists.

The epidemiologist who encounters secondary cases of infectious diseases *in duly warned private households* may be excused for being depressed. But the epidemiologist who encounters secondaries *in the very hospitals* to which the

more seriously infective cases are removed for *the very purpose* of obviating infection from them, should be praised for the exasperation with which he too often learns later of spread of infection within the hospital itself, the one place above all others where it might be assumed that information, training and conscientious care of the latest and most approved kind would be concentrated against this very point. The negligence of physicians, nurses, superintendents of hospitals,—the very attitude of surprise that hospital people assume when asked about such precautions,—the light skepticism with which hospital attendants (because of the corresponding attitude "higher up") treat the hygienic requests of patients, the (occasional) directions of physicians, even the orders of public health departments, show that the basic essentials of medical asepsis are unknown or considered "faddy." We only regret that this scorching, but fully deserved indictment of hospital management in the hygiene of disease cannot be quoted here in full, and we heartily indorse the proposition that probationers should never be intrusted with the nursing of infectious diseases.

A mother who assumes risks in nursing her own infectious child is exercising her private right to risk her own safety, but a nurse, not fully trained, set to nurse infections without the necessary training or experience should have good grounds for suit at law if she contract the disease, *and so has any other inmate of the hospital, infected because of the employment of such a nurse, or because of other similar negligence.*

H. W. HILL.

Borderland Studies. Vol II. By GEORGE M. GOULD, M.D. *Published by P. Blakeston's Sons Co., Philadelphia.*

This is a "miscellaneous collection of essays and addresses pertaining to medicine and the medical profession, and their

relations to general science and thought." Printed in clear type on heavy paper, making a very attractive book of 311 pages.

The first chapter, The History of the House, is profusely illustrated.

While this book can never reach the circulation of the author's dictionaries, still it is one that can be read with interest both by physicians and laymen.

B. L. ARMS.

Methods and Devices for Bacterial Treatment of Sewage. By WILLIAM MAYO VENABLE, M.S., M.I.S.C.E., etc. *First Edition, pp.* 231. *John Wiley & Sons, New York,* 1908.

Chap. I. Introduction.
Chap. II. Sources of Information About Sewage Apparatus.
Chap. III. Aërobic Treatment of Crude Sewage.
Chap. IV. Mechanical Removal of Sludge.
Chap. V. Anaërobic Treatment of Sewage.
Chap. VI. Intermittent Contact Systems.
Chap. VII. Automatic Discharging Devices.
Chap. VIII. Percolating Filters.
Chap. IX. Summary of Engineering Principles Regarding the Design of Sewage Purification Works.
Chap. X. Difficulties Experienced in Some Actual Installations.
Chap. XI. Suggested Designs to Meet Typical Conditions.

Chaps. III to VIII, inclusive, discuss sewage purification in its various aspects. The several methods of treatment considered in historical order are kept distinct in the presentation. Extensive use has been made of drawings of United States

patents, both old and recent. The best feature of the book is the historical treatment of the various devices, especially patented ones, which have been used for sewage disposal. The descriptions of the various automatic discharging devices in Chap. VII is especially complete. In the chapter on Percolating Filters it does not seem as if enough attention has been given to the description of the various sprinkler nozzles in common use for distributing the sewage. Neither does the reviewer find any description of the aphidian distributor in common use in England. As has been stated above, the book contains very little about the chemistry and bacteriology of sewage, and of the biological processes which take place during the process of purification. In Chap. IX, however, are given several paragraphs which embody some of the conclusions of such studies by other workers. The writer gives the results of his experience in connection with the sewage disposal plants at Des Moines, Ia., and Fort Leavenworth, Kans., and in the last chapter of the book works out a design consisting of septic tank, deep filter bed and shallow contact bed for a typical case. The book is well illustrated, especially with cuts of siphons. It contains a reprint of an interesting plate by Leonard Metcalf, C.E., entitled the "Antecedents of the Septic Tank."

ROBERT SPURR WESTON.

BOOKS RECEIVED

Physician's Visiting List for 1909. *P. Blakeston's Son & Co., Philadelphia, Pa.* $1.00.

General Bacteriology. E. O. JORDAN. *W. B. Saunders & Company, Philadelphia, Pa.* $3.00. *

List of Publications of U. S. Public Health and Marine Hospital Service. October, 1908. *Government Printing Office.*

* To be reviewed in February Journal.

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